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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN No. 1018-AF80

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 224

[Docket No. 991108299-0313-02; ID No. 102299A]

RIN No. 0648-XA39

Endangered and Threatened Species; Final Endangered Status for a Distinct Population Segment of Anadromous Atlantic Salmon (Salmo salar) in the Gulf of Maine

AGENCIES: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce; U.S. Fish and Wildlife Service (FWS), Interior.

ACTION: Final rule.

SUMMARY: The National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) (the Services) determine endangered status pursuant to the Endangered Species Act of 1973 (ESA), as amended, for the Gulf of Maine distinct population segment (DPS) of Atlantic salmon. A biological review team (BRT) composed of the Services staff completed a comprehensive status review of Atlantic salmon which resulted in the proposed listing on November 17, 1999. After reviewing additional information, including information submitted during the comment period on the proposed listing, and after considering the low numbers of returning adults, the lower than anticipated parr to smolt survival, and the serious and continuing nature of threats to the species, the Services conclude that the Gulf of Maine DPS warrants protection under the ESA. The Services have determined that the Gulf of Maine DPS is in danger of extinction throughout its range.

DATES: The effective date of this rule is [insert date 30 days after date of publication in the FEDERAL REGISTER]..

ADDRESSES: The complete file for this final rule is available for inspection, by appointment, during normal business hours at the National Marine Fisheries Service, One

Blackburn Drive, Gloucester, Massachusetts 01930; or the U.S. Fish and Wildlife Service, 300 Westgate Center Drive, Hadley, Massachusetts 01035.

FOR FURTHER INFORMATION CONTACT: Mary Colligan, NMFS, at the address above (978-281-9116), or Paul Nickerson, FWS, at the address above (413-253-8615).

SUPPLEMENTARY INFORMATION:

Background

Species Life History and Status

A summary of the status of Atlantic salmon in Maine is included in this document. Additional biological information for the Gulf of Maine DPS of Atlantic salmon can be found in the Services 1995 and 1999 status reviews. The 1999 Status Review can be viewed at the following site: http://news.fws.gov/salmon/asalmon.html. This information is also summarized in previous Federal Register documents (59 FR 3067, January 20, 1994; 60 FR 14410, March 17, 1995; 60 FR 50530, September 29, 1995; 62 FR 66325, December 18, 1997; 64 FR 62627, November 17, 1999).

Consideration as a Species Under the Endangered Species Act

The ESA defines species as any species of fish or wildlife or plants, and any distinct population segment [DPS] of any species of vertebrate fish or wildlife that interbreeds when mature. 16 U.S.C. 1532(15). This definition allows for the recognition of DPSs at levels below taxonomically recognized species or subspecies.

The Services have published a policy (61 FR 4722, February 7, 1996) to clarify the phrase "distinct population segment" for the purposes of listing, delisting, and reclassifying species under the ESA. This DPS policy identifies three elements to be

considered in a decision regarding the status of a possible DPS as endangered or threatened under the ESA: (1) The discreteness of the population segment in relation to the remainder of the species or subspecies to which it belongs; (2) the significance of the population segment to the species or subspecies to which it belongs; and (3) the conservation status of the population segment in relation to the ESA listing standards. The conservation status for this DPS will be discussed in relation to the ESA s listing factors.

A population segment may be considered discrete if it satisfies either one of the following two conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors; or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the ESA.

The Services examined life history, biogeographical, genetic, and environmental information in evaluating Atlantic salmon throughout its U.S. range. The Services used zoogeographic maps of boundaries between areas that likely exert different selective pressures on Atlantic salmon populations and have substantial differences in riverine-marine ecosystem structure and function. Key elements to these determinations include: (1) spatial arrangements of river systems that create isolation, and (2) watershed location within ecological provinces and subregions that affect the productivity and ecology of riverine-marine ecosystem complexes. Using zoogeographic maps, the Services determined that historic U.S. Atlantic salmon populations were comprised of at least

three population segments: Long Island Sound, Central New England, and Gulf of Maine. As detailed in the 1999 Status Review, the Long Island Sound and the Central New England population segments have been extirpated. The following two sections on discreteness and significance provide the rationale for the Services determination that the Gulf of Maine populations comprise a DPS.

The Gulf of Maine DPS includes all naturally reproducing remnant populations of Atlantic salmon from the Kennebec River downstream of the former Edwards Dam site, northward to the mouth of the St. Croix River. The DPS includes both early- and late-run Atlantic salmon (Baum, 1997). The river specific hatchery reared fish are also included as part of the DPS. However, these hatchery fish will not count toward a delisting until they have spawned naturally in the wild. Historically, the Androscoggin River delimited the range of the DPS to the south, but populations south of the Kennebec River have been extirpated.

There are at least eight rivers in the DPS range that still contain functioning wild salmon populations, although at substantially reduced abundance levels (Baum 1997; King et al. 1999). The core of these remnant populations is located in the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot Rivers and Cove Brook.

Discreteness of the Gulf of Maine Population Segment of Atlantic Salmon

The Services examined three major indicators to determine whether the Gulf of Maine population segment of Atlantic salmon is separate from other populations: (1) Straying of spawning fish from their natal river; (2) recolonization rates outside the range

of the population segment; and (3) genetic differences observed throughout the range of Atlantic salmon. The separateness analysis for the Gulf of Maine population segment from other Atlantic salmon populations reviewed the following: (1) persistence of these populations; (2) geographic segregation; (3) limited stocking from outside the population segment; and (4) genetic analyses. The Services conclude from this information that genetic and demographic data demonstrate the Gulf of Maine population segment is separate from other populations to the north.

The Services also conclude that while it is unlikely that any Atlantic salmon populations in the United States exist in a genetically pure native form, present populations are descendants of these aboriginal stocks, and their continued presence in indigenous habitat indicates that important heritable local adaptations still exist. The conservation of the populations of the Gulf of Maine population segment is essential because these Atlantic salmon represent the remaining genetic legacy of ancestral populations that were locally adapted to the rivers and streams of the region that formerly extended from the Housatonic River in Connecticut to the headwaters of the Aroostook River in Maine.

The northern range of the Gulf of Maine population segment is delimited by the natural zoogeographical constraints on local adaptations and an international boundary. There are substantial differences in the control of exploitation, management of habitat, conservation status, and regulatory mechanisms of Atlantic salmon between the United States and Canada (May, 1993; Baum, 1997). Management and conservation programs in the United States and Canada have similar goals, but differences in legislation and

policy support the use of the United States/Canada international boundary as a measure of discreteness for the purposes of evaluating stock status. Therefore, the Services conclude that the Gulf of Maine population segment of Atlantic salmon satisfies both criteria for demonstrating discreteness, as outlined in the Services' DPS Policy. However, we note that it is only necessary to satisfy one of these criteria to conclude that the population segment is discrete from other populations.

Significance of the Gulf of Maine Population Segment of Atlantic Salmon

The second element of the Services DPS Policy is the consideration of the population segment s biological and ecological significance to the taxon to which it belongs. This may include, but is not limited to, the following: (1) Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon; (2) evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon; (3) evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range; or (4) evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

Riverine habitat occupied by the Gulf of Maine population segment of Atlantic salmon is unique in that it is at the southern extent of the North American range of Atlantic salmon (Saunders, 1981; Baum, 1997). To survive at the extreme southern range, U.S. Atlantic salmon populations had to adapt to distinct physical and environmental conditions (Saunders, 1981). The Services conclude that there is substantial evidence that

remnant populations of the Gulf of Maine population segment have persisted in their native range. The loss of this population segment would result in a significant gap in the range of this taxon, moving the range of this species an additional degree of latitude to the north. The loss of these populations would restrict the natural range of Atlantic salmon to the region above the 45th parallel and beyond the borders of the United States.

We cannot ignore that artificial selection created by hatchery practices has had some influence upon the present genome of the Gulf of Maine population segment. Given our current understanding of the genetic composition of these stocks (Bentzen and Wright, 1992; Kornfield, 1994; King et al., 1999), the documented persistence of native stocks (Kendall, 1935; Baum, 1997), and the fact that most of the hatchery stocking influences were internal to the Gulf of Maine population segment range, the Services conclude that hatchery fish have not substantially introgressed with the remnant populations and genomes of the fish that comprise the Gulf of Maine population segment. The majority of fish stocked into the population segment rivers came from the Penobscot hatchery stock, which, in turn, had originated from the population segment rivers earlier this century (Baum, 1997). The Services believe that there is an important genetic legacy remaining in the population segment, and the loss of these populations would negatively affect the genetic resources of Atlantic salmon as a whole because it would contribute to further range reduction. The genetic resources of these most southerly stocks are considered vitally important to the species future survival.

Based on a review of available information, the Services concluded that the Gulf of Maine population segment of Atlantic salmon meets both criteria for discreteness.

Available data demonstrate that the population segment has unique life history characteristics that have a heritable basis and that both environmental and genetic factors make the Gulf of Maine population segment different from other populations of Atlantic salmon in their life history and ecology. Further, the Services conclude that the available information supports the conclusion that the Gulf of Maine population segment of Atlantic salmon is biologically and ecologically significant. The Gulf of Maine population segment satisfies the first two criteria of the Services DPS policy because it is both discrete and significant, and therefore, it is a DPS. The third and final element is the conservation status of the population segment in relation to the ESA s standards for listing. The conservation status of the DPS is examined in the following sections which provide an overview of the habitat within the DPS, population abundance, and an analysis of the listing factors.

Description of the Habitat Within the Gulf of Maine DPS

The Gulf of Maine DPS encompasses all naturally reproducing remnant populations of Atlantic salmon from the Kennebec River downstream of the former Edwards Dam site, northward to the mouth of the St. Croix River. The Penobscot and its tributaries are only included downstream from the site of the Bangor Dam. The watershed structure, available Atlantic salmon habitat, and abundance of Atlantic salmon stocks at various life stages are best known for the seven largest rivers with extant Atlantic salmon populations. There is less known about the habitat and population ecology of smaller rivers, with the possible exception of Cove Brook (Meister, 1962; Baum, 1997).

Broadly speaking, the watersheds within the DPS are sparsely populated and generally are managed for the growth and harvest of forest products and lowbush blueberries. The Ducktrap and Sheepscot River watersheds were once intensively farmed but are now mostly forested. The habitat within the DPS range is generally characterized as being free-flowing, medium gradient, cool in water temperature, and suitable for spawning in gravel substrate areas.

Population Abundance of the Gulf of Maine DPS

Abundance is a critical criterion in assessing the status of a species under the ESA. Current abundance compared to historical levels and analysis of recent trends were used to determine the biological status of Atlantic salmon of the Gulf of Maine DPS. Documented returns of adult Atlantic salmon within the DPS range are low relative to conservation escapement goals (U.S. Atlantic Salmon Assessment Committee (USASAC), 1999). The conservation escapement goal is defined as the number of returning adults needed to fully use the spawning habitat. The total documented natural (wild & stocked fry) spawner returns to the rivers of the Gulf of Maine DPS range for the past 5 years were: 1995 (83); 1996 (74); 1997 (35); 1998 (23); 1999 (32); and 2000 (22) (preliminary data). It must be noted that counts are provided only for rivers with trapping facilities and only for periods when those facilities were operational. Therefore, the documented count does not represent a complete count of adult returns to the rivers within the DPS range.

The pre-fishery abundance index of North American salmon stocks that migrate to the Greenland region of the North Atlantic Ocean continues to be low in spite of

apparently improving marine habitat conditions as reflected by ocean surface temperature data in the past few years (North Atlantic Salmon Work Group (NASWG), 1999). The pre-fishery abundance is an estimate of the one sea winter fish (1SW), (fish that have spent one winter in the sea since leaving the river) in Greenland prior to the fishery and is used as a possible indicator of future returns to homewaters. The apparent non-response to improving marine habitat to date is believed to be caused, in part, by generally depressed spawning populations in North American home rivers and the resultant low number of juvenile salmon entering the ocean.

Generally speaking, densities of young-of-the-year salmon (0+) and parr (1+ and 2+) remain low relative to potential carrying capacity. The numbers indicate how long the parr have been in the rivers subsequent to hatching. In Maine, most parr remain in the rivers for 2 years. These depressed juvenile abundances, where not supplemented by stocking, are a direct result of low adult returns in recent years. A total parr population estimate is not available for the entire DPS. However, the Atlantic Salmon Commission (ASC) and NMFS have conducted a basin-wide parr population study on the Narraguagus River since 1991. In addition, the NMFS and the ASC have been conducting a study on the Narraguagus River, monitoring the outmigration of smolts including the timing of migration, survival, length, weight, and the number of smolts from 1996 through 1999 (Kocik et al., 1998a).

Since 1996, estimates of large parr in the Narraguagus River have ranged from 11,700 to 27,000, while corresponding outmigrating smolt estimates range from 2,800 to 3,600. Even in years with a substantial increase in large parr production (126 percent),

smolt production has increased only modestly (3 percent). Total estimated smolt production in the Narraguagus is well below the estimated production capacity (18,000) and warrants further investigation. The preliminary estimate of the emigrant smolt population in the Narraguagus in 1999 was 3,607, which would represent production from the 1996-1997 spawners. Based on this, an average overwinter survival for 1999 was calculated to be 14.3 percent. Overwinter survival in 1999 was significantly lower than observed in 1997 (24.4 percent) and not statistically significantly different from 1998 estimates. These studies suggest that there is a 99-percent probability that overwinter freshwater survival from 1+ and older parr to smolt was less than 30 percent, the minimum estimate cited in previous studies. Survival estimates in the Narraguagus River for all years studied are substantially lower than estimates previously reported in scientific literature and previously accepted estimates for this region (Bley, 1987; Bley and Moring, 1988; Baum, 1997; Kocik et al., 1999). Thus, smolt production from freshwater habitat is much lower than would be expected based on habitat surveys and prior estimates of survival rates. These substantially lower survival rates could be negatively impacting population recovery. Additionally, researchers found that approximately half of the emigrating smolts do not reach the Gulf of Maine. These preliminary data led the Services to conclude that low overwinter and emigration survival rates may be impeding the recovery of these populations and are an issue of concern. The cause for the low survival rates has not been identified.

To determine if recent pre-smolt and marine survival estimates on the Narraguagus River are representative of other downeast Maine Atlantic salmon rivers, a

similar study was conducted on the Pleasant River. In 1999 from April to June, 676 smolts were captured in a smolt trap on the Pleasant River. An additional 31 fish were captured with fin deformities and coloration, and body form suggesting that they were of hatchery origin. A commercial hatchery that raises Atlantic salmon smolt is located upstream of the capture site.

Given the data reviewed and summarized in this section, the Services conclude that naturally reproducing Atlantic salmon populations of the Gulf of Maine DPS are at extremely low levels of abundance. This conclusion is based principally on the fact that spawner abundance is less than 10 percent of the number required to maximize juvenile production, juvenile abundance indices are lower than historical counts, and freshwater smolt production is less than a third of estimated capacity. Fry are being stocked to fill available habitat and parr abundance is increasing as a result. The number of smolts leaving the river, however, is not increasing at the same rate.

Conservation Hatchery Program

Broodstock developed from wild fish from the Dennys, East Machias, Machias, Narraguagus and Sheepscot Rivers are held at Craig Brook National Fish Hatchery (CBNFH) in Orland, Maine. These captive broodstock increase the effective population size for these rivers and provide a buffer against extinction. Parr were collected from the Pleasant River and were transferred to the North Attleboro National Fish Hatchery (NANFH) in Massachusetts. These Pleasant River fish were later destroyed due to the presence of a newly discovered Atlantic salmon viral disease, Salmon Swimbladder Sarcoma Virus (SSSV). In the spring of 2000, program cooperators initiated a second

attempt to rebuild a captive wild broodstock for the Pleasant River salmon population. This was made possible by the creation of six isolation bays as part of the reconstruction of the CBNFH. A trap on the Pleasant River at Columbia Falls captured emigrating Atlantic salmon smolts to help enumerate the population and to determine origin (wild or aquaculture). A total of 37 smolts and 24 age 2+ parr were brought into the CBNFH for holding until they mature for broodstock. Subsequently, 52 age 1+ parr were collected during the summer of 2000 to augment the earlier smolt and parr collections.

The response of Atlantic salmon populations to supplemental stocking programs can be partially evaluated based on juvenile production, but adult returns are the ultimate evaluation measure. It takes over 4 years from initial fry stocking to detect a response to that stocking in terms of returning adults. A substantial number of fry must be stocked to produce significant results due to the normal high mortality of juvenile fish. Because stocking did not begin in some rivers until 1996 and several year classes are necessary to present a trend, it will not be known until at least 2001 if fry-stocked fish will contribute a substantial element to all five rivers for which there is a river-specific stocking program.

All of the broodstock held at the CBNFH are now fitted with Passive Integrated Transponder (PIT) tags which allow for complete tracking and management of the broodstock, as well as tracking the mating and offspring of the broodstock. In 1999, the FWS expanded its Atlantic salmon genetics program to include genetic characterization of all broodfish used for the rehabilitation of Maine s wild populations. This characterization will help managers maintain the genetic integrity of wild and captive

fish, identify appropriate management units, help prevent irreversible losses of genetic diversity, and evaluate the stocking program. Additional details on protocols used within CBNFH are described in the Response to Comments section of this document. In addition to the CBNFH program, the Maine aquaculture industry is participating in the supplementation program by raising fish derived from the broodstock. These fish were stocked in the Dennys and Machias Rivers as potential spawners in the fall of 2000.

Previous Federal Actions

In 1991, the FWS designated Atlantic salmon in five rivers in Downeast Maine (the Narraguagus, Pleasant, Machias, East Machias, and Dennys Rivers) as Category 2 candidate species under the ESA (56 FR 58804, November 21, 1991). Both Services received identical petitions in October and November of 1993 to list the Atlantic salmon (Salmo salar) throughout its historic range in the contiguous U.S. under the ESA. On January 20, 1994, the Services found that the petition presented substantial scientific information indicating that a listing may be warranted (59 FR 3067).

The Services conducted a joint review of the species in January 1995, and found that the available biological information indicated that the species described in the petition, Atlantic salmon throughout its range in the United States, did not meet the definition of species under the ESA. Therefore, the Services concluded that the petitioned action to list Atlantic salmon throughout its historic United States range was not warranted (60 FR 14410, March 17, 1995). In the same notice, the Services determined that a DPS that consisted of populations in seven rivers (the Dennys, East Machias, Machias, Pleasant, Narraguagus, Ducktrap, and Sheepscot Rivers) did warrant

listing under the ESA. On September 29, 1995, after reviewing the information in the status review, as well as state and foreign efforts to protect the species, the Services proposed to list the seven rivers DPS as a threatened species under the ESA (60 FR 50530, September 29, 1995). The proposed rule contained a special rule under section 4(d) of the ESA which would have allowed for a State plan, approved by the Services, to define the manner in which certain activities could be conducted without violating the ESA. In response to that special provision in the proposed rule, the Governor of Maine convened a task force which developed a Conservation Plan for Atlantic Salmon in the seven rivers. That Conservation Plan was submitted to the Services in March 1997.

The Services reviewed information submitted from the public, current information on population levels, and assessed the adequacy of the Maine Atlantic Salmon Conservation Plan, and on December 18, 1997, withdrew the proposed rule to list the seven rivers DPS of Atlantic salmon as threatened under the ESA (62 FR 66325). In that withdrawal notice, the Services redefined the species under analysis as the Gulf of Maine DPS to acknowledge the possibility that other populations of Atlantic salmon could be added to the DPS if they were found to be naturally reproducing and to have wild stock characteristics. NMFS maintained the Gulf of Maine DPS as a candidate species to acknowledge ongoing concern over the species status. In the 1997 withdrawal notice, the Services outlined three circumstances under which the process for listing the Gulf of Maine DPS of Atlantic salmon under the ESA would be reinitiated: (1) An emergency which poses a significant risk to the well-being of the Gulf of Maine DPS is identified and not immediately and adequately addressed; (2) the biological status of the Gulf of

Maine DPS is such that the DPS is in danger of extinction throughout all or a significant portion of its range; or (3) the biological status of the Gulf of Maine DPS is such that the DPS is likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

The Services received the State of Maine 1998 Annual Progress Report on implementation of the Conservation Plan in January 1999. On January 20, 1999, the Services invited comment from the public on the first annual report and other information on protective measures and the status of the species. The comment period remained open until March 8, 1999 (64 FR 3067). The Services reviewed all comments submitted by the public and provided a summary of those, along with their own comments, to the State of Maine in March 1999. The State of Maine responded to the Services comments on April 13, 1999.

In order to conduct a comprehensive review of the protective measures in place and the status of the species, as was committed to in the 1997 withdrawal notice, the BRT was reconvened to update the January 1995 Status Review for Atlantic salmon. The 1999 Status Review was made available on October 19, 1999 (64 FR 56297). On November 17, 1999, the Services published a proposed rule to list as endangered the Gulf of Maine Atlantic salmon DPS, which includes all naturally reproducing remnant populations of Atlantic salmon from the Kennebec River downstream of the former Edwards Dam site northward to the mouth of the St. Croix River at the United States-Canada border. The Services stated that to date they had determined that these populations are found in the Dennys, East Machias, Machias, Pleasant, Narraguagus, Sheepscot, and Ducktrap Rivers

and in Cove Brook, all in eastern Maine.

The proposed rule invited comment from the public and specifically solicited comments regarding: (1) biological, commercial trade, or other relevant data concerning any threat (or lack thereof) to this DPS; (2) the location of any additional populations of the Gulf of Maine DPS of Atlantic salmon within the DPS range, including, but not limited to, Bond Brook, Togus Stream, Passagassawaukeag River, Kenduskeag Stream, Felts Brook, and the Pennamaquan River; (3) additional information concerning the range, distribution, and population size of the DPS; (4) current or planned activities in the subject area and their possible impacts on this DPS; (5) additional efforts being made to protect naturally reproducing populations of Atlantic salmon; and (6) the relationship of existing hatchery populations to natural populations of the DPS.

Summary of Comments and Information Received in Response to the Proposed Rule

We have reviewed all written and oral comments received during the comment period and have incorporated updated data and information into appropriate sections of this rule. We have organized substantive comments concerning the proposed rule into specific issues. We grouped comments of a similar nature or subject matter into a number of broader issues. These issues and our response to each are presented in the subsections below.

The proposed rule announced a comment period to close on February 15, 2000. On January 7, 2000, the Services extended the comment period to March 15, 2000 (65 FR 1082). On March 15, 2000, the Services further extended the comment period to April 14, 2000 (65 FR 13935). During the 150-day public comment period, the Services

received over 200 written comments. Three public hearings were held: January 29, 2000, in Machias, Maine; January 31, 2000, in Ellsworth, Maine; and February 1, 2000, in Rockland, Maine (65 FR 1082). Nearly 1,000 individuals attended the three public hearings.

In addition to soliciting and reviewing public comments, the Services must seek peer review of its listing proposals. On July 1, 1994, the Services published a series of policies regarding listings under the ESA, including a policy for peer review of proposed listings (59 FR 34270). In accordance with this policy, on February 9, 2000, the Services requested peer review of the proposed rule. The proposed rule and status review were sent to six reviewers and responses were received from three of these reviewers.

A summary of the peer review comments and the other comments received in response to the proposed rule follows.

Issue 1: Peer Review

Comment 1: Some commenters voiced objections that the proposed rule and genetic data have not been peer reviewed.

Response: The 1995 proposed rule, 1995 status review, 1997 genetics reports, and the November 1999 proposed rule were subjected to international peer reviews. Six scientists outside the Services with no involvement in the status review process were asked to critically review the proposed rule; three responded. The three peer reviewers concluded that the recommendation to list the population as endangered was consistent with the current status of the population and the requirements of the ESA.

One peer reviewer stated that there was insufficient evidence in support of the

Gulf of Maine DPS designation but recommended that its conservation status warranted special consideration. That reviewer also stated that because Atlantic salmon have a refined homing instinct with minimal straying, the status of Atlantic salmon populations in Canada will have no bearing on the persistence and recovery of Atlantic salmon in Maine. That reviewer further stated that the absence of irrevocable evidence of genetic and ecological discreteness, as well as significance, is irrelevant in this context.

The second peer reviewer agreed with the overall conclusions of the proposed rule, but pointed out several areas of inconsistencies in the proposed rule. This reviewer raised concern over the fact that Atlantic salmon aquaculture is already well established in the DPS range and expressed concern over the use of weirs to identify the influence of aquaculture-reared fish on the wild salmon. This reviewer cautioned against the use of hatchery stocks for restoration, and advised that a genetic monitoring regime should be implemented for each hatchery stock. Finally, this reviewer recommended a greater discussion of the implications of dams (both natural and artificial) and dam removal on historic and potential life history strategies for Atlantic salmon.

The third peer reviewer supported listing and found the biological information to be well founded and described, and concurred that the population segment is discrete and in danger of extinction. This reviewer cited run timing, size of fish, strong homing instincts, sea age at maturity, and management differences in the United States and Canada as evidence of a DPS. This reviewer expressed concern over the low numbers of adult returns and stated that the heavy loss of smolts on their outward migration suggested a hypothesis related to endocrine disrupting chemicals from chemical spray

and other endogenous sources. This reviewer stated that the conclusion that aquaculture practices must be carefully controlled and regulated is justified and cited information from Norway and Scotland as support. This reviewer encouraged further investigation to discover the magnitude and causes of at sea mortality and encouraged consideration of the possible effects of climate change on the Gulf of Maine DPS.

Comment 2: Several comments were made that the Federal stocking program should be subjected to an external peer review.

Response: The Services supported the premise of a peer review of the salmon hatchery program when it was requested by the State of Maine in January 1999. The Services continued to cooperate with the State of Maine, Trout Unlimited, and the National Fish and Wildlife Foundation in assembling the peer review panel and the scope of the review. This initiative ended in late 1999, when the State of Maine withdrew its support. The Services would again support an external review of the state, Federal, and private hatchery programs in Maine.

Issue 2: Accuracy and Sufficiency of the Scientific Data

Comment 3: Several commenters stated that there is a lack of data on the actual population size of the DPS and the causes of the stated decline. Comments specifically questioned the exclusion of Penobscot River adult returns from the DPS data and the present existence of any wild salmon populations in the Pleasant and Dennys Rivers. It was suggested that no revision of the earlier 1997 decision as to the status of the DPS should be made until all data are demonstrated to be complete and unequivocal.

Response: The numbers reported in the 1999 Status Review and reflected in the

proposed rule represent actual fish counts. The Narraguagus River is the only river with relatively complete and accurate population data during the period of population decline. Adult salmon counts on the other DPS rivers are either partial or completely lacking. However, during the review period there were counts of spawning redds in those rivers that provide strong and consistent circumstantial evidence that the decline in adult salmon spawners documented in the Narraguagus River occurred simultaneously in other DPS rivers. The implication of the redd counts is that the entire adult salmon population in the Gulf of Maine DPS numbers in the low hundreds. The number of adults counted annually at the Veazie Trap in the Penobscot River are the direct or indirect product of salmon juveniles stocked from Green Lake and CBNFH as part of the 30-year restoration effort in that river. The Penobscot, with the exception of Cove Brook, which is a tributary to the Penobscot, is not currently considered part of the Gulf of Maine DPS. The return numbers to the Penobscot are of interest because they provide insight into the marine survival of North American stocks.

A partial salmon trapping program and the observation of redds in the Dennys River and occasional observation of wild adult salmon and redds most years in the Pleasant River are adequate indications that a salmon population still exists at some level in those rivers. Because of its proximity to marine cages, the Dennys River is most likely to bear the greatest impact from aquaculture escapees. However, the genetic analyses of individuals taken as juveniles from the Dennys River to be used as broodstock for the CBNFH indicate that these fish are of wild origin. The Pleasant River population is probably the most at risk due to low numbers of adults combined with juvenile fish that

escaped from or were discharged from an aquaculture hatchery in the watershed. We do not believe that the failure to observe redds for one year is evidence of extinction. In fact, as of August 2000, three wild adult salmon were reported at the weir site. At any point in time, there are usually 5 or more different generations, or year classes, of a river population in existence. A failure of one spawning year class does not represent extinction. There is also the possibility that redds were present but not observed because of river conditions.

The data for adult salmon returns and for juvenile salmon within rivers in the DPS are not complete, but clearly demonstrate that a serious population decline has occurred over the past 10 to15 years. The database on redd counts, the thorough documentation of the Narraguagus population trend, the general sea survival trend indicated by hatchery-based populations on the Penobscot, the extensive database on population trends on many Canadian rivers and the abundance estimates of 1SW salmon off the West Greenland feeding grounds maintained by the International Council for the Exploration of the Sea (ICES), all provide evidence of the precarious state of the Gulf of Maine DPS of Atlantic salmon.

Comment 4: One commenter complained that the Services failed to provide the raw data that formed the basis of the description of the DPS and the conclusion that the DPS was in danger of extinction.

Response: All data used by the Services in the development of the proposed rule was referenced in the Review of the Status of Anadromous Atlantic Salmon (Salmon salar) Under the United States Endangered Species Act (July 1999) and has been

available through a number of sources. The genetics information used in the Status Review and proposed rule is contained in reports that present analyses of raw genetics data developed by the USGS, and much of it has been available on the internet. The raw data for these genetic reports were requested by the State of Maine and provided by the USGS. Because the USGS had not yet completed compiling the most recent raw genetics data available, there was a delay in responding to a request for these data. The data were provided to the requestor as soon as processing and quality control requirements were completed by the laboratory. These new data were not available for use or consideration in the development of the proposed rule, nor were these data relied upon in the development of the final rule.

Comment 5: Some commenters stated that there was no basis in the information available to justify revision of the decision made relative to the 1997 withdrawal.

Response: The reasons for the November 17, 1999, proposed listing are specifically described on pages 62636 and 62637 of the published proposed rule. The second paragraph on page 62637 stipulates the factors that are primary sources of concern. Major changes in the status of salmon documented by data available after the 1997 decision and leading up to the 1999 proposed rule relate to new disease and genetic threats, continuing concerns about threats posed by aquaculture escapees, lack of progress in resolving concerns over existing aquaculture practices, low juvenile in-river survival levels, continuing decline in adult returns, and the lack of sufficient progress in dealing with sport fishing (at that time) and water withdrawals.

Comment 6: Some commenters stated that there are no data to form a basis for the

Services determination that the population will go extinct rather than recover in response to current recovery activities.

Response: The data available from the study of juvenile survival in the Narraguagus River, the discovery of a large number of aquaculture hatchery origin juveniles in the Pleasant River, a new and growing threat of a fatal viral disease, Infectious Salmon Anemia (ISA), the increasing use of European strain salmon by the Maine aquaculture industry, and the extremely low marine survival indicated by data developed by the ICES, were considered in the context of the data and show a continued decline of DPS adult salmon returns. Under such circumstances, the Services have determined that a listing of endangered is appropriate. A recovery plan will be developed which will contain recovery targets. When those recovery targets are achieved, then the Gulf of Maine DPS may be considered for reclassification.

Issue 3: Inclusion of Other Rivers

Comment 7: Some commenters questioned why other Atlantic salmon rivers, such as the Penobscot, in the geographic range of the DPS were not included in the proposed rule.

Response: Salmon from a given river were excluded from the DPS if information indicated that the fish likely did not substantially represent a wild population that had persisted through time. Information used to make that determination included the existence of a reproducing population that historically had access to natal spawning habitat adequate to have persisted, and the likelihood and extent of introgression with fish from outside the geographic range of the DPS. This latter factor was assessed with a

variety of data including stocking history (number of fish, life stages, and source population), return rates of stocked fish, the origin of returning adults (i.e., hatchery vs. wild), and genetic characterization.

Tributaries in the lower portion of the Penobscot River (south of the Bangor dam) were included within the geographic range of the DPS because of their continued historic free access to migrating salmon, as evidenced by the existence of at least one genetically unique, naturally reproducing population. A decision whether to include or exclude fish that inhabit the mainstem of the river or tributaries above Bangor dam has been deferred until further analysis has been completed, including a detailed genetic characterization. Samples have been collected and are currently being analyzed. The Services plan to make a determination as to the appropriateness of adding the mainstem and upper tributaries of the river to the DPS in the year 2001.

Issue 4: Reason for Observed Genetic Difference

Comment 8: Some commenters questioned whether the genetic differences noted between the fish from the Gulf of Maine DPS and Canadian populations, and among populations in the DPS, could reflect the effects of small population size (e.g., population bottlenecks, genetic drift, founder effects) or introgression of non-native fish, rather than the existence of historical, adaptively important genetic differences.

Response: Numerous studies have shown that Atlantic salmon are naturally substructured into genetically differentiated populations, and that this structure is important to the overall fitness and productivity of the species. Recent analyses indicate that genetic structure exists among the fish in the DPS rivers. Whether this structure

reflects the existence of adaptively important traits is subject to varying interpretations, although it should be noted that the different interpretations of the data presented are not mutually exclusive. Small populations can maintain important, genetically based, adaptive traits.

After analysis of all available data, especially in the context of the DPS representing the extreme southern terminus of the present range of wild stocks in North America, the Services concluded that the remaining populations have retained unique, adaptively important genetic traits, the loss of which could preclude recovery of self-sustaining populations. Hence, the Services are concerned with preventing irreversible changes to the genetic integrity of the remaining populations.

Recognizing that there are differences in how the genetic data are interpreted, it should be noted that the genetic differences observed among wild populations within North America are not central to the listing decision. The Gulf of Maine DPS is delineated largely by its unique geographical location and ecological setting relative to other salmon populations.

Issue 5: Delineation of the Gulf of Maine DPS

Comment 9: Some stated that the proposed DPS appears to have been contoured to coincide with the political need of the Federal restocking program to justify the capital and operational costs of its river-specific breeding program.

Response: The rivers comprising the current range of the Gulf of Maine DPS have long held a special designation by the State of Maine. In the July 1984 Management of Atlantic Salmon in the State of Maine, A Strategic Plan, the Maine Atlantic Sea-Run

Salmon Commission designated seven rivers as Category A , having fishable populations of wild Atlantic salmon. These are seven of the eight rivers that comprise the Gulf of Maine DPS. In 1991, in response to a continuous decline of these wild Atlantic salmon populations, the FWS designated them as Category 2 candidate species under the ESA, developed a prelisting recovery plan in cooperation with the Atlantic Sea-Run Salmon Commission, and initiated a river-specific fish culture program. The DPS designation and river-specific culture program for six of these seven rivers is the product of those events and an ESA Status Review in 1995. Contrary to the premise of the comment, in review of the original petition to list Atlantic salmon throughout the U.S. range, the Services specifically rejected as listable entities several salmon populations that were the focus of five Federal hatcheries representing considerably greater capital and operational costs.

Issue 6: Effect of Previous Stocking

Comment 10: Some commenters questioned how there could be a river specific genetic strain of fish with 128 years of stocking. Another commenter stated that it appeared that distinct populations of Atlantic salmon in the Ducktrap River and Cove Brook have persisted over time despite the fact that throughout history less than 100,000 fry were stocked in the Ducktrap and no salmon were stocked in Cove Brook.

Response: Evidence suggests that stocking success was relatively poor prior to 1971. From 1971 to 1990, most stocking efforts in Maine used smolts rather than earlier life stages with survival much improved over earlier stocking efforts. Starting in 1991, all stocking within the Gulf of Maine DPS has been river-specific in origin.

Recent genetic studies show that unique genetic material exists in the Ducktrap River and Cove Brook. Although local variability is present in these stocks, they appear to be more closely related to other DPS stocks than to either Canadian or European stocks.

Some authors have asserted that the magnitude of past stocking efforts has facilitated introgression and eliminated local variability (Kornfield et al., 1995). While the historic isolation of stocks within the DPS may have been greater and supported higher levels of genetic difference, subtle distinctions between stocks within the DPS remain, and differences relative to populations outside the DPS are clear. The majority of Atlantic salmon stocks used for supplemental stocking within the Gulf of Maine DPS have been from within the DPS geographic range (Baum, 1997). Because the source of most stocking efforts has been from within the DPS, the genetic effects from stock mixing would be substantially less than from stocks from outside the DPS. A comprehensive examination of unstocked and stocked DPS rivers suggests that while past stocking efforts have likely increased gene flow between populations, this gene flow was insufficient to eliminate local variability (King et al., 2000a; King et al., 2000b).

Comment 11: Some commenters believed that it is dangerous to label Maine's salmon populations as a DPS since there is no historical baseline from pre-stocking years to compare.

Response: There are no known biological samples available for genetic testing prior to 1940 from Atlantic salmon of either northern or southern populations. It is true that having such samples from Atlantic salmon populations prior to stocking would be

useful. However, the Services are required to use the best available scientific information upon which to base a determination. The Services believe that acknowledgment and protection of existing genetic diversity is critical to the survival of salmon within the DPS. It is also important to note that the Gulf of Maine DPS is delineated largely by its unique geographical location and ecological setting relative to other populations.

Issue 7: Relationship between Life History, Morphometric Characteristics, and Genetics

Comment 12: Some commenters questioned the reliance on life history and morphometric characteristics in delineating the DPS, as they did not believe these are genetically based.

Response: Life history and morphometric characteristics have been shown to be related to both genetics and environment and their interaction. The proportion of 2SW fish in Maine stocks, age at smoltification, and marine maturation rates of several salmonid species have been shown to be heritable traits.

Differences in life history among U.S. Atlantic salmon stocks and those of Canada were identified as early as 1874 (Atkins, 1874). U.S. Atlantic salmon stocks have been composed of predominantly 2SW salmon (> 80 percent) from at least the late 1800s to the present (Atkins, 1874; Kendall, 1935; and USASAC, 1999). In contrast, many Canadian stocks and several in Europe have a much higher grilse component with a concurrently lower 2SW component that is frequently less than 50 percent (Hutchings and Jones, 1998). This life history trait is partially controlled by stock genetics (Bailey et al., 1980; Naevda, 1983; Glebe and Saunders, 1986; Ritter et al., 1986; Herbinger and Newkirk, 1987; Hutchings and Jones, 1998; Palm and Ryman, 1999). U.S. stocks have a

return age composition that differs from Canadian stocks, especially neighboring stocks in the Scotia-Fundy region. It is most probable that these differences are primarily due to genetic make-up. The sex ratios of 1SW salmon differ between Maine DPS rivers and nearby Canadian rivers. Maine 1SW salmon are predominantly (95 percent) male (Baum, 1997) while those in the Miramichi River, Canada, are only about 75 percent male (Randall, 1985). Genetic control of maturation rates in salmonids is not exclusive to Atlantic salmon (Naevda et al., 1981; Naevda, 1983; Iwamoto et al., 1984; and Burger and Chevassus, 1987).

The migration at sea differs between Maine DPS rivers and Canadian rivers; Maine salmon have been shown to migrate at low percentages to East Greenland while Canadian salmon have not been found there (Baum, 1997), and Maine DPS salmon return to their natal rivers earlier in the year than Canadian salmon (Baum, 1997). Size of adult salmon returning to Maine rivers differs between the Gulf of Maine DPS and the nearby Canadian population segment. Maine 1SW salmon are about 2.5 centimeters (cm) longer than Miramichi River, Canada, salmon, and Maine 3SW salmon are about 6.0 cm longer than those in nearby Canadian rivers (data from Baum, 1997 and Randall, 1985). Furthermore, the egg production of Maine DPS salmon is about 10 to 20 percent greater than that of Saint John River salmon of similar size (data from Baum and Meister, 1971 and Randall, 1985).

Recent analyses of juvenile Atlantic salmon data suggest that while environment has a strong influence upon juvenile growth, smolt age and maturation (precocious parr) (Brannon, 1982), heritable differences between stocks also influence growth and

performance (Baily, 1980; Hershberger et al., 1982; Iwamoto et al., 1982, 1984; Saxton et al., 1984; Iwamoto et al., 1986; Kincaid, 1994; and Hutching and Jones, 1998) and ultimately determine the ability of stocks to exploit their native habitat (Metcalfe, 1998). Though many of the distinct life history traits displayed by Maine salmon relative to nearby Canadian stocks have not been experimentally shown to have a genetic basis, it is unlikely that environmental factors alone can account for all of these differences (Baum, 2000). The combination of heritable traits and the unique environment in Maine constrain the scope of adaptation and provide pressures of natural selection that are exhibited in unique life history characteristics.

Taking into account all of the foregoing factors, the Services BRT determined that differences in life history characteristics historically contributed to the distinctness of the Gulf of Maine DPS. Remnant stocks have maintained the most characteristics of these factors: Smoltification at a mean age of two, different migration patterns and earlier run timing, predominant adult returns as 2SW fish (age four), low proportion of female 1SW fish, longer 1SW and 3SW fish, and greater egg production. Since the proportion of 2SW fish in an Atlantic salmon stock has a documented genetic basis (Naevda, 1983; Glebe and Saunders, 1986; Ritter et al., 1986; Herbinger and Newkirk, 1987; Hutchings and Jones, 1998; and Palm and Ryman, 1999), the BRT concluded that the DPS has unique life history characteristics that have a heritable basis. The BRT also concluded that both environmental and genetic factors make the Gulf of Maine DPS markedly different from other populations of Atlantic salmon in their life history and ecology. The National Academy of Sciences will be conducting a study of Atlantic salmon. Upon

evaluation of the final report, the Services will take appropriate action, if any.

Issue 8: Separateness of the DPS

Comment 13: Some commenters questioned whether adequate data existed to support the contention that the Gulf of Maine DPS is separate from other U.S. stocks of Atlantic salmon.

Response: Defined zoogeographical regions in New England separate the Gulf of Maine DPS from populations in most of the other New England rivers. Although biological data are lacking for these extirpated stocks, it is likely that populations were distinct because of differences in selective pressures in each region.

Issue 9: Reproductive Isolation

Comment 14: Some commenters questioned how the Gulf of Maine DPS could be reproductively isolated when substantial numbers of females per generation migrate between the DPS rivers and the Penobscot River.

Response: Migration rates between rivers are not large. Tagging studies have shown that hatchery fish (which tend to have higher straying rates than wild fish) stocked into Maine rivers exhibited a straying rate of one to two percent. In Norway, populations are considered discrete despite straying rates of five to eight percent. Additionally, studies show that although mixing of stocks has occurred, genetic differences between stocks exist.

Issue 10: Historic Distribution and Abundance of Atlantic Salmon in North America

Comment 15: Some commenters cited studies which suggest that Atlantic salmon did not occur in North America before or during the last glacial period (approximately

70,000 to 10,000 years ago) and the limited documentation of these populations prior to the 1800's combined with sporadic records during the first half of this century raises questions regarding their historic abundance. In addition, some commenters questioned the reliance in the Status Review on four or five biological surveys taken in intervals of about 20 to 25 years. Since there were significant stocking efforts in between these time periods, they stated that fish documented in these surveys (once every 20 years or so) are not necessarily from native or wild populations.

Response: Anadromous Atlantic salmon were native to nearly every major coastal river north of the Hudson River (Atkins, 1874; Kendall, 1935). Genetic differentiation between North American and European stocks (Taggart et al., 1995) supports the assumption that Atlantic salmon were present in North America before the last glacial period and that they persisted over time (Behnke, 1996). However, populations may have migrated southward for a time while their northern range was covered with glacial ice (Behnke, 1996). Claims that Atlantic salmon did not exist in New England before or during the last glacial period or before 1500 are based on the fact that no salmon bones have ever been found in excavated regions of the area (Carlsson, 1993). These explanations do not take into account the acidity of the soil in Maine and surrounding regions which may have naturally destroyed the delicate bones over time (Behnke, 1996), or that genetics data suggest differentiation about 8,000 to 10,000 years ago. Based on the best available data, there were likely at least 11 U.S. coastal watersheds outside of Maine that historically supported wild salmon populations. Beland (1984) reported that at least 34 Maine Rivers held Atlantic salmon populations at one time. Other sources

report the number to be 28 (MacCrimmon and Gots, 1979; Kendall, 1935).

Issue 11: Importance of Genetics

Comment 16: Some commenters questioned that if genetic differences were that important, then how could Atlantic salmon from the Penobscot River be used to successfully establish runs of wild salmon in the Connecticut River? Additionally, they questioned if multiple populations established from a donor population would differentiate into genetically distinct populations in 20 generations.

Response: The loss of naturally reproducing fish in the Connecticut and Merrimack River drainages represented nearly 40 percent of historic U.S. Atlantic salmon juvenile production habitat. The loss of habitat in these two southernmost rivers and their indigenous Atlantic salmon populations certainly had an influence on the genetic diversity of this species in the United States and North America. These rivers are currently the focus of restoration efforts using nonindigenous stocks mostly of Penobscot River origin. Return rates from stocking in the Connecticut and Merrimack Rivers have been poor relative to other North American stocks (Saunders, 1981; Friedland et al., 1993). These low return rates appear to be attributable to the loss of local adaptations to unique habitat characteristics associated with the extirpated stocks (Jones, 1978; Lindell, 1987; Saunders, 1981). Additional research supports this hypothesis and indicates that when stocks are transferred to new river systems, those from nearby rivers typically exhibit higher return rates than stocks from rivers farther away (Ritter, 1975; Reisenbichler and McIntyre, 1977; Riddell et al., 1981; Ritter et al., 1986; and Hopley, 1989). Additionally, stock specific differences in susceptibility to bacterial and viral

diseases underscore the importance of genetic variability not only to the viability of local stocks but as a genetic resource for conservation, restoration, and commercial aquaculture applications (Gjedrem and Gjoen, 1995). The loss of locally adapted stocks has made restoration more difficult in southern New England. Fortunately, some salmonids have shown evidence of plasticity when introduced to new environments, and locally adapted and genetically differentiated stocks have developed in less than 20 generations (MacCrimmon and Marshall, 1968; MacCrimmon et al., 1970; MacCrimmon, 1971; and Krueger et al., 1994). Reintroduction and range-expansion programs use this plasticity to create viable populations, but typically success rates are highest with neighboring stocks or those from similar ecosystems (Reisenbichler and McIntyre, 1977; Krueger et al., 1981; and Reisenbichler and Rubin, 1999). As these restoration programs continue, their focus on the redevelopment of river-specific stocks should enhance the genetic resources of Atlantic salmon in the United States.

Issue 12: The Role of the River Specific Stocking Program in Recovery

Comment 17: Some commenters questioned the appropriateness and success of the FWS river specific stocking program.

Response: The Atlantic salmon rehabilitation program is a cooperative program involving numerous State and Federal agencies, as well as non-governmental organizations. There has been a considerable amount of review, oversight, and guidance on every aspect of this program (fish culture, health, genetics, management, and habitat evaluation) since its inception in 1991. The Maine Atlantic Salmon Technical Advisory Committee (TAC) reviews program activities and makes recommendations to the

Atlantic Salmon Commission (ASC), and the Services for final decisions. Also, the USASAC provides guidance to program cooperators.

The Services supported the suggestion for a peer review of the river specific stocking program when it was proposed in January 1999, by the State of Maine, Trout Unlimited, and National Fish & Wildlife Foundation. This initiative was dropped when the State of Maine withdrew its support in the fall of 1999. The role of the river specific program will be examined during the development of the recovery plan.

Comment 18: Some commenters voiced concern about the restoration program and the potential disastrous failure of that program in terms of interbreeding, adapting the fish to freshwater, and misplacing wild fry in habitat.

Response: Although the above mentioned aspects of the stocking program are discussed and reviewed continually among program cooperators, the discussion in the Status Review did not address many of the concerns presented during the public comment period. These issues will be discussed much more comprehensively during the development of the recovery plan.

The level of genetic diversity in Maine Atlantic salmon populations is very similar to the level found in Canada. The level of genetic diversity found in fish within the DPS is similar to the level of genetic diversity found in other North American populations, which indicates that the genetic diversity and variation have not been diminished by the river specific fish culture program. All precautions are being taken by cooperators in broodstock collections, management and spawning protocols to ensure that this genetic integrity is maintained. Monitoring of the river-specific Atlantic salmon

broodstock at CBNFH show that the heterozygosity of the rivers has not been compromised and is sufficiently robust to maintain a viable population at this time. Continuous monitoring protocols are in place to ensure that genetic integrity is maintained.

While it is true that the captive broodstock at CBNFH have not seen a marine phase, many years of adult returns from the hatchery-produced progeny of hatchery-reared broodstock indicate that this should not affect the ability of the offspring to undergo smoltification and emigrate to the ocean after the normal 2-year in-river juvenile phase.

Habitat in the rivers in the DPS has been mapped during low summer flows by Maine ASC and FWS biologists. Efforts are made during stocking to target areas which have been identified as good fry habitat. Fry stocking is usually suspended during periods of higher than normal flows to prevent stocked fry from being washed out of the target stocking areas.

Comment 19: Some commenters cited poor returns in 1997, 1998, and 1999 as evidence of failure of the river-specific stocking program.

Response: The life history of the Atlantic salmon is complex. Survival at all life stages is dependent upon many biological and physical factors in the freshwater and marine environments. The goal of the river-specific stocking program is to ensure that the freshwater rearing habitat is optimally used by genetically suitable stocks for the purpose of producing out-migrating smolts in spite of low returning adult populations. The goal is to maintain a population until those factors which are negatively affecting

populations are lessened through naturally occurring forces and/or human intervention.

Hatchery program evaluations indicate that the hatchery program, through both fry and broodstock releases, has increased the juvenile population beyond what the low number of returning adults would provide.

It has taken several years to develop captive broodstock from parr collection in numbers sufficient to optimally use the rearing habitat. This level of use has been approached only within the last 4 or 5 years. The adult returns to DPS rivers in recent years reflect releases of relatively small numbers of fry. It is premature to make any statements regarding the success or failure of the stocking program s contribution to adult returns since it takes four years to grow from a fry to adult salmon. Significant adult returns from significant numbers of stocked fry should begin to appear in 2001.

The Services will continue to monitor the success of the hatchery program and continue to explore ways to improve hatchery releases, especially in light of the newly redesigned CBNFH isolation facility. For example, the current program was recently revised to sample and track the DNA from individuals which comprise a mating pair. This allows the tracking of stocked fry and better assessment, monitoring, and management of the fish culture program.

The best scientific principle, which is accepted world-wide, dictates that the best source to use to rebuild a fish or wildlife population is that same population. If this population does not exist, then the next best population to use is one that is nearby and similar biologically. The remnant populations of six of the eight rivers within the Gulf of Maine DPS range are being used to maintain and rebuild these salmon populations.

Comprehensive DNA fingerprinting of each salmon broodstock for the DPS rivers indicates that the level of genetic diversity and variation are similar to other North American populations. This indicates that the river-specific program has not diminished the genetic integrity of these populations. All precautions are being taken by program cooperators in broodstock collections, management, and spawning protocols to ensure that this integrity is maintained. Continuous monitoring of the river-specific Atlantic salmon broodstock at CBNFH shows that the hetereozygosity of the rivers has not been compromised and is sufficiently robust to maintain a viable population.

The goal of the Atlantic salmon rehabilitation program is to maintain a juvenile population of genetically compatible salmon while optimizing the use of rearing habitat to produce out-migrating smolts until the adult population recovers adequately to meet natural reproduction requirements. Monitoring studies have shown that juvenile populations in areas which have been stocked with fry are higher than would be expected from the observed levels of natural reproduction. The hatchery program also provides refugia for salmon populations which are at low levels and in danger of ceasing to exist, as is the case with the Gulf of Maine DPS salmon populations. The stocking program has been successful in these aspects of the program. Continued monitoring of the river-specific stocking program will be conducted to evaluate its impact on the recovery of the Gulf of Maine DPS. Modifications based upon the results of the monitoring will be made as necessary.

Comment 20: One commenter suggested that the Services should work with the new ASC and direct the hatcheries to return all river-specific fish they have in the holding

tanks to their specific rivers - return all to their home rivers, remove all weirs and allow the fish to move naturally.

Response: Returning all hatchery broodstocks to the rivers of origin is an option that could be posed to the ASC for discussion within the Commission, and with other involved state and Federal agencies, and the interested public for consideration.

The Services believe, however, that this action, under current environmental conditions, would pose an unacceptable risk to the small remnant populations in the Gulf of Maine DPS for several reasons. The hatchery system serves two functions. It provides a refuge for those remnant salmon populations which are in danger of extinction, as well as increasing the probability of rebuilding these populations, because survival at all lifestages in the hatchery is much greater than in the wild. This affords an opportunity to protect and maintain these populations until environmental conditions become more favorable to the survival of the salmon through natural cycles, and as a result of habitat protection and enhancement being conducted by agencies and watershed councils.

Broodstock that are surplus to the needs of the hatchery are returned to their river of origin. In 1996, 503 adult fish were returned to their rivers, 583 in 1997, 907 in 1998, and 81 in 1999.

Comment 21: One commenter claimed that the river specific stocking program has no biological basis at this time due to low population sizes.

Response: The benefits and risks of a river-specific rehabilitation program must be considered in the context of population dynamics, especially population size, which can cause (1) inbreeding depression, (2) loss of genetic variation, and (3) outbreeding

depression. If populations become small, the risk of inbreeding depression and loss of genetic variation increases. In response to this, one management option is the introduction of fish from outside the population; however, hazards such as outbreeding depression are associated with this option.

For the salmon in question, each population is comprised of multiple year classes of wild and captive fish. The effective population size is hence much larger than the number of returning adults in any given year. Nonetheless, if effective population size becomes low, or if genetic data indicate a loss of variation within a population, then it would be appropriate to consider modification of the river-specific protocols for a given population. DNA fingerprinting of broodstock indicates that the levels of genetic diversity within the broodstocks from the DPS rivers are similar to other wild populations in other countries. In addition, many precautions are being taken by program cooperators in broodstock collections, management, and spawning protocols to ensure that genetic integrity is maintained.

Comment 22: Some commenters stated that the existing stocking program is clearly not working, and suggested that the Services invite the watershed councils and sporting clubs to help redesign that program. They suggested that the current program be replaced with a new river-by-river stocking program with oversight groups that are composed of at least 50 percent local citizens.

Response: The current rehabilitation program is a river-by-river program using remnant populations to rebuild the salmon populations. The redesign and reconstruction of the CBNFH has allowed cooperators to develop broodstocks for six of the eight DPS

rivers, with no plans being made to develop broodstock for the Ducktrap River and Cove Brook.

The watershed councils participate in the current program and are invited to provide input through Project SHARE (Salmon Habitat and River Enhancement), watershed council meetings, and meetings of the Downeast River Coalition, as well as informal discussions with the agencies. Watershed Councils are also encouraged to participate in meetings of the Maine TAC and ASC, and are actively participating in stocking and fish culture activities. This is an evolving process, and it is anticipated that the agencies and watershed councils will work more closely together as time goes on. For example, the Downeast River Coalition and various fishery agencies have cooperated in developing the Pleasant River Broodstock Management Plan. Additional opportunities for involvement will be available during the recovery planning process.

Issue 13: Fish Health

Several comments were received on the relative risk to the DPS from fish diseases. These comments raised questions of three types: (1) Questions regarding the risk posed by aquaculture fish, specifically concerning ISA; (2) questions regarding the need to destroy the Pleasant River broodstock; and (3) questions regarding why Federal hatcheries are not held to the same fish health standards as private fish culture facilities.

Comment 23: Some commenters stated that there is no basis to presume that aquaculture fish pose a special threat to wild salmon in Maine since (a) ISA has existed in Canada for 3 years without appearing in any U.S. fish, (b) there is no scientific documentation of aquaculture fish transmitting disease to wild fish, and (c) the disease

already exists in the wild.

Response: The Services recognize that disease is a natural part of wild salmon s existence as fish pathogens are a normal part of the aquatic environment. However, the concern raised in the proposed rule relates primarily to the recent occurrence of two disease organisms that were previously unknown in the DPS s geographic area. One is the SSSV recently discovered in Pleasant River broodstock (see Response 13b).

The second is the occurrence of the ISA virus in Canadian aquaculture pens, some within the known infective range of U.S. sea pens. The ISA virus is extremely destructive to maturing salmon and there is no known cure. This virus has only been known to cause disease in situations where fish were artificially confined and was not observed in the carrier state in free ranging salmon or other species until very recently. The ISA virus has been found in wild salmon in Scotland, as well as in confined rainbow trout, wild sea trout, and eels. There is a possibility that the virus can be spread to confined populations (e.g. sea pens) by wild fish of other species, but that has not yet been demonstrated. It is known that it is transmissible laterally between fish pens within 5 kilometers (km) of each other, and by the discharge of slaughter wastes. ISA disease has, to date, only been found in wild fish that have been exposed to infected aquaculture fish in New Brunswick, Canada. There are Canadian aquaculture sites with recent ISA infections close enough to U.S. aquaculture sites in Cobscook Bay, the location of Maine s greatest concentration of salmon aquaculture pens, to create a significant risk of the introduction of the virus to U.S. aquaculture stocks. The extensive testing and precautions that have been taken by the Maine aquaculture industry and the State in

response to this situation underscore this risk. A significant portion of the adult DPS salmon must swim near U.S. pens in Cobscook Bay and the vicinity of the Machias Rivers. The possible establishment of ISA in and around U.S. pen sites, and its presence in nearby Canadian aquaculture sites pose a risk to wild salmon. This may have severe consequences and was not known to exist during the 1995 Status Review. The Services recognize that fish pathogens exist in the wild, and aquaculture operations or any other artificially created concentration of fish do not in themselves create pathogens or disease. However, the effect of concentrations of individuals on magnifying the level of any pathogen present and the rate and extent of any resultant epizootic is well known (Finlay and Falkow, 1989). Therefore, the Services concluded that the presence of the ISA virus in the geographic range of the DPS, and the existence of extensive concentrations of net pens create a new and significant risk directly to the DPS adults and indirectly to the rehabilitation program currently supplementing the DPS juvenile population.

Comment 24: One commenter questioned the decision to destroy the Pleasant River broodstock.

Response: State and Federal agencies responsible for producing fish for release in the wild maintain extensive fish health management programs designed to protect the fish being produced for the public, the facilities used to produce them, and most importantly, the public health and health of other wild fish populations and their environment. Procedures to be followed by an agency when a fish disease situation develops are documented through guidelines and policies (e.g. Fish and Wildlife Service National Fish Health Policy and Guidelines, New England Salmonid Health Guidelines, and various

state regulations) which are generally based on procedures described in the so-called Blue Book produced by the American Fisheries Society. In general, the most stringent counteractions to a disease outbreak in a hatchery are called for when the disease agent is a newly discovered pathogen or one that had not previously been found in the affected geographic area. This was the case with the disease that attacked the Pleasant River wild broodstock being held in captivity at the North Attleboro National Fish Hatchery (NANFH). A retrovirus named SSSV and believed to be the cause of fatal symptoms that developed in the sub-adult Pleasant River broodstock, represented a previously unknown salmon disease. The extent of the threat posed to salmon was not known but, under conditions that existed at the NANFH, the disease was fatal and had no known treatment. The Massachusetts Fish and Wildlife Department, in accordance with customary procedures with an exotic disease, required the FWS to remove these fish from the hatchery which discharges its water into state public waters. The surviving fish were placed in quarantine facilities available at the USGS laboratory in West Virginia so that research could be conducted before destroying and disposing of these infected fish. Subsequent testing of a related group of Pleasant River broodstock held at a private facility in Maine showed these fish also carried the virus, though there were no disease symptoms. These fish had to be removed in order to protect the viability of the facility as a commercial hatchery. No suitable quarantine facilities existed that could safely hold the fish, thus necessitating their destruction. Even if quarantine facilities could have been found and the fish never developed symptoms, their usefulness as broodstock was compromised. Since the virus may be transmissible from an infected parent to the eggs it

produced, and given the exotic nature of the virus, any juvenile salmon produced from those infected fish could represent a serious threat to wild and aquaculture fish, and could not prudently be released into the wild.

In the spring of 2000, program cooperators initiated a second attempt to preserve and rebuild the Pleasant River salmon population. This was made possible by the reconstruction of CBNFH and the addition of one isolation bay. A trap on the Pleasant River at Columbia Falls captured outmigrating Atlantic salmon smolts to help enumerate the population and to determine origin (wild or aquaculture). A total of 37 smolts and 24 age 2 parr were brought into CBNFH for holding until they become mature broodstock. Subsequently, 52 age 1+ parr were captured during the summer of 2000 to augment these earlier smolt and parr collections.

In the past year, the FWS and the State of Maine have developed procedures to manage broodstock from populations that contain the SSSV. Newly captured wild broodstock are held in isolation for testing. Any carriers of the virus are culled from the broodstock population in the hatchery prior to spawning, and fry are tested for the presence of the virus prior to release. In 1999, the FWS, in cooperation with the Maine Fish Health Technical Committee, developed a Best Management Plan for SSSV for the CBNFH. All broodstock which previously tested positive for SSSV were removed from the spawning population and not used in the 1999 spawning season.

Comment 25: Federal hatcheries are not held to the same fish health standards as private fish culture facilities.

Response: As a matter of national policy, a national fish hatchery abides by the

fish health regulations of the state in which it is located or the state to which fish are shipped. Further, national fish hatcheries abide by the FWS s Fish Health Policy and Guidelines and, in New England, the New England Salmonid Health Guidelines in cases where those requirements are more stringent than the prevailing state requirements. In special situations dealing with imperiled fishes, the Service and the appropriate state agency may develop special procedures, especially relative to disease testing and monitoring, if general practices are not possible for rare stocks.

Issue 14: Fish Stocking Policies in DPS Rivers

Comment 26: Comments were received that questioned how the listing would deal with the current stocking policies in the DPS rivers. Brook and brown trout have been stocked in some of the DPS rivers and landlocked salmon are known to populate headwater lakes of DPS rivers. Concern was raised regarding the potential for interbreeding, competition, and agonistic behavior among and between species.

Response: As noted in the Review of the Status of Atlantic Salmon (Salmo salar) under the U.S. Endangered Species Act (1999), interactions between wild Atlantic salmon and other salmonids are mostly limited to interactions with brook trout and brown trout. Competition between species likely plays an important regulatory role and may cause Atlantic salmon, brook and brown trout populations to fluctuate on an annual basis. However, it is difficult to draw conclusions regarding the effects and magnitude of interspecific competition or (in the case of landlocked salmon) the extent of interbreeding.

The Maine Department of Inland Fish and Wildlife recently began an evaluation

to better understand the interactions between Atlantic salmon and other freshwater fishes. A draft report entitled Potential Interactions Between Atlantic Salmon and Freshwater Fishes has been completed with specific emphasis on DPS rivers. The report is now being routed through administrative channels with a copy to the ASC for review.

Results of the draft evaluation suggest that areas that require additional evaluation or scrutiny include the Sheepscot River where natural reproduction of brown trout is known to occur. Brown trout were once stocked in the watershed. While they are no longer intentionally released in the river, wild populations will continue to be monitored in future years. Both landlocked and sea-run salmon are known to spawn at the outlet of Meddybemps Lake, the headwaters of the Dennys River watershed. Management measures that will include screens at the outlet of the lake may minimize interactions by limiting the introduction of landlocked salmon to the river. A proposal to rear brown and rainbow trout, as well as a brook trout/char crosses in an aquaculture venture in the Sheepscot River estuary has been approved by the U.S. Army Corps of Engineers (ACOE). Also, surveys have documented a resident population of largemouth bass in the Ducktrap River. This species was released in the watershed in the 1960's, and currently there is no viable way to control the population. It is anticipated that the fishery resource agencies will continue to assess and evaluate the potential for impacts to sea-run Atlantic salmon resulting from interactions with other fish species. Where feasible and appropriate, measures will be implemented to avoid and minimize adverse impacts to salmon.

Issue 15: Bycatch of Atlantic Salmon in Commercial Fisheries

Comment 27: Four comments were received concerning the issue of a listing and its potential adverse effect on other commercial fisheries. Specifically there was concern that listing would immediately result in a closure of elver fishing and consequently limit jobs.

Response: Juvenile eels, or elvers, begin to migrate into Gulf of Maine watersheds in March with peak migrations occurring in April and May. Extended migrations sometimes continue into June and July. The elver migration and fishery occurs coincident with the emigration of Atlantic salmon smolts. The elver fishery may extend into June, coincident with immigration of adult salmon destined for upriver spawning areas. Regulations of the elver fishery include a season from March 22 to May 31, ban on harvest of elvers upriver of the head-of-tide, limits on the length of fyke nets that can be set in waterways, prohibition on nets from the middle third of any waterway, and a requirement for finfish excluder panels integral with nets to minimize bycatch and mitigate adverse impacts on non-target species. Most nets are deployed near head-of-tide and immediately adjacent to the shore. Entry into the elver fishery was limited in 1999 to reduce harvest, and in 2000, a lottery was introduced for license acquisition. American eels are managed by an interstate fishery management plan under the Atlantic States Marine Fisheries Commission. As long as the member states are in compliance with the fishery management plan, there will be no closures or changes in the state program.

Elvers are often evenly distributed throughout the water column when moving upriver on the flood tide but near head-of-tide they are found along the shore. Maine Department of Marine Resources (DMR) biological staff in recent years have not

observed or documented incidental bycatch of either juvenile or adult Atlantic salmon in elver nets. Fish species that have been captured in small numbers include smelt, pollock, stickleback, pipefish, and mummichog. Fishing effort for elvers has decreased in the last 3 years because of restricted license issuance and the fact that market price has decreased considerably. It is not likely that there will be fishery closures or loss of jobs in this fishery, nor a significant decrease in license issuance when the Gulf of Maine DPS of Atlantic salmon is listed as an endangered species.

Issue 16: Poaching

Comment 28: Some commenters were concerned that a reduction of recreational angler presence on DPS rivers would increase poaching.

Response: Measures continue to be implemented by resource agencies to minimize and eliminate the illegal take of salmon on DPS and other salmon rivers in the State of Maine. Funds were made available through grants to support two State seasonal enforcement staff on DPS rivers in years 1998 and 1999, and residual grant funds have been used to purchase surveillance equipment in the year 2000. While funding for enhanced fishery enforcement efforts on DPS rivers diminished in 2000, resource agency personnel are keenly aware of the need to advise recreational anglers and the public that protection of Atlantic salmon is a high priority. The DMR is posting signs on salmon rivers that advise of the presence of salmon and the need for their protection. In addition, the DMR has employed a seasonal Marine Patrol Officer to promote and enforce recreational fishing regulations.

While all waters in the State of Maine are closed to angling for sea-run salmon,

other protective measures are also being implemented on an as-needed basis. In late June 2000, a reach of the Penobscot River immediately downstream from the Veazie Dam was closed to all angling to eliminate the accidental capture of salmon. The ban on fishing was needed because striped bass anglers were catching salmon in that area. This reach of river downstream of the dam is a location where both salmon and striped bass congregate. The reported bycatch of salmon by anglers fishing for American shad on the Narraguagus River prompted an increase in enforcement personnel presence on the river during spring 2000. In addition, resource personnel involved in scientific studies on the Narraguagus River have kept enforcement staff advised of angler activity and have continued to advise anglers and the public of the need to protect all life stages of salmon.

A unique initiative involving the release of mature salmon in the Dennys River and the Machias River estuary in fall 2000, is expected to foster cooperation among anglers and residents of these watersheds for the protection of salmon. This cooperative venture involving the aquaculture industry and fishery resource agencies will place a full complement of adult salmon on the spawning grounds in the Dennys River and adult fish in the lower Machias River. Interest in this initiative is high among stakeholders, and it is anticipated that this interest will offer increased protection for salmon in the watersheds. This program will be evaluated to determine the utility of this approach in a recovery effort.

Issue 17: Aquaculture

Comment 29: The concern has been raised that fish being used in aquaculture have not been removed from the wild for a sufficient amount of time to become

genetically distinct from wild stocks. As a result, these fish should not pose a threat to wild resident populations should they escape from captivity.

Response: A large percentage of the fish being used in aquaculture currently are of European origin and, therefore, are genetically different from the native North American strains. North American strains used by the industry are genetically different from wild North American strain due to changes introduced through domestication. The industry selects fish best suited to grow in captivity, which would likely select for different traits and characteristics than those most suited for survival in the wild.

Comment 30: One commenter suggested that farm raised fish should be introduced into the rivers to allow fishing for everybody and improve the economy.

Response: The goal of the Maine Atlantic salmon rehabilitation program is to enhance and protect the eight remnant populations of Atlantic salmon in the rivers which comprise the Gulf of Maine DPS. The Services are using river-specific remnant populations and rebuilding them to the spawning escapement level needed to sustain the population. This is to achieve both human and environmental benefits, so that people will be able to fish for these salmon in the future, as they have done in the past.

Farm fish releases for sport fishing are inappropriate, particularly at a time when the salmon runs are so endangered. Recovery of wild runs and permanent habitat protection are the objectives of conservation for the Gulf of Maine DPS. Sport fishing can be considered once the other objectives are attained.

Comment 31: One commenter questioned the decision not to stock some river-specific fish from aquaculture facilities into the rivers due to fish health concerns.

Response: River-specific Atlantic salmon being raised by the aquaculture industry in net pens located in Machias Bay will be released into appropriate rivers after passing a comprehensive fish health survey. These releases are part of an evaluation program being overseen by the TAC to rebuild the salmon populations in these rivers, evaluate the impacts of these releases on juvenile populations, and set a direction for future cooperative programs with the aquaculture industry. The TAC is created by a Cooperative Agreement and is composed of state and Federal representatives who advise the Federal and state resource agencies on any technical matters relative to the Atlantic salmon restoration and rehabilitation programs in Maine.

The river-specific fish held in Cobscook Bay will not be released based on the recommendation of the Maine Fish Health Technical Committee. This recommendation was made as a result of the risk of spreading ISA to wild salmon populations and aquaculture facilities in the United States. This quarantine procedure is consistent with protocols adopted in Canada to prevent the spread of this virus in an effort to protect both the wild and aquaculture stocks of Atlantic salmon. ISA is already present in the Canadian side of Cobscook Bay.

Comment 32: Some commenters questioned the evidence regarding numbers of escapees in rivers or actual impact on wild stocks in Maine from aquaculture, including any impacts from the use of European stocks.

Response: Since the aquaculture industry began in the Canadian Maritime Provinces in 1979, escapees from sea pens and hatcheries have been documented in 14 rivers in New Brunswick and Nova Scotia, Canada. The Magaguadavic River is the only

river in the Maine/Maritime area that has been monitored closely for interactions between wild and farmed fish. That monitoring began in 1992. Adult salmon of farmed origin have outnumbered wild salmon in that river since 1994 and exceeded 80 percent for three of the five years between 1994 and 1998. Analysis of eggs taken from the Magaguadavic River in 1993 revealed that at least 20 percent of the redds were constructed by females of farm or cultured origin, and another 35 percent were of possible cultured origin (Carr et al., 1997). In addition, emigrating smolts in 1996 were 51 to 67 percent farm-origin and those exiting the river in 1998 were 82 percent farm-origin and cited as evidence of leakage of juveniles from aquaculture facilities on the watershed (Canadian Department of Fisheries and Oceans (DFO), 1999).

The U.S. aquaculture industry is newer and smaller than the Canadian industry, but has been growing rapidly. Occurrences of adult escapees in Maine Rivers are increasing commensurately. Maine production increased from less than 500,000 smolt stocked and 2,000 metric tons produced annually before 1990 to over four million smolt stocked and up to 15,000 metric tons (mt) produced annually by 1998. There is a standing crop of about six million sub-adult salmon in pens in eastern Maine (Baum, 2000). Since documented escapees in Maine rivers were listed through 1997 in the 1999 Status Review, Baum (2000) has provided documentation of 143 more adult escapees observed for the St. Croix, Dennys, Narraguagus, and Union Rivers for 1997-1999. Though the St. Croix and Union Rivers are not DPS rivers, they serve to demonstrate the relation between increasing numbers of salmon in net pens and the increasing occurrence of escapees in nearby rivers. In evaluating the extent of escapes, it must be remembered

that these are observed escapees and represent only a portion of actual escapees.

Intensive studies of genetic interaction between wild salmon and aquaculture escapees in Northwest Ireland rivers have clearly demonstrated that escaped juvenile salmon have completed their entire life cycle in the wild, including accurate homing to natal rivers and interbreeding with wild salmon (Clifford et al., 1998). It has been demonstrated that escapees are present in some of the DPS rivers, and many have been observed to be sexually mature (Baum, 2000). There is recent observation of circumstantial evidence of a female aquaculture escapee successfully spawning in the Dennys River (personal communication, Ed Baum, 1996). Genetic studies (King et al., 1999) have shown the rare occurrence in wild (DPS) fish collected in Maine of alleles that are common in European stocks. This strongly suggests that some level of introgression of European alleles may have already occurred. The experiences from rivers in Canada (DFO, 1999), Ireland (Clifford et al., 1998), and Norway (Fleming et al., 2000), which are very similar to Maine salmon rivers, and where aquaculture has a longer history and a greater level of investigation, provide substantial evidence that negative impacts to the DPS can be reasonably anticipated to occur in Maine.

Comment 33: Some commenters stated that the voluntary Code of Containment combined with weirs on some rivers provide adequate protection of wild stocks from escapees without any further steps needed.

Response: There were no data collected for the Dennys, Pleasant, Machias, East Machias, Ducktrap, or Sheepscot rivers for sea pen escapees during the last three years.

Where data are available (Baum, 2000), there is a clear trend towards increasing numbers of escapees from cages entering nearby Maine rivers commensurate with the rapid expansion of aquaculture in eastern Maine. This increase is occurring in spite of most Maine sea pens currently implementing the voluntary industry Code of Containment standards.

Comment 34: One commenter suggested that a 1- percent pen escape rate (based on Norwegian data) and a 1- percent survival to the river (basis of commenter s estimate uncertain) would result in 600 escapees in the eastern Maine rivers (with a standing crop of six million). As the great bulk of salmon are raised near the estuaries of the Dennys and the two Machias Rivers, the commenter supposed that annual escape to those rivers would outnumber the estimated DPS populations in those rivers by several fold. Among these rivers, a weir is present only on the Dennys. Trapping facilities and a weir are planned for the Machias/East Machias respectively, but the date and financing are undetermined. It is also important to note that weirs are seasonal structures and, therefore, do not trap fish on a year-round basis. Fish barriers can reduce the degree of threat from a relatively large number of escapees, but cannot be considered as adequate protection for the DPS.

Response: Recent evidence of juvenile escapees from an aquaculture hatchery emigrating as smolts from the Pleasant River (Baum, 2000) represent a threat that Codes of Containment for sea pens and weirs entirely fail to address. A commercial hatchery is also located on the East Machias River.

Issue 18: Marine Survival

Comment 35: Some commenters questioned why the Services consider Maine salmon populations to be on the verge of extinction instead of simply attributing the decline to population cycles.

Response: Although population dynamics of Atlantic salmon are intimately related to and influenced by environmental variables, threats caused by man exacerbate the severity of the situation. These threats are serious enough to make a difference between survival and extinction. It is important to note that Atlantic salmon populations continue to decline even with recent increases in favorable marine environmental variables.

Issue 19: Climate Change

Comment 36: Some commenters cited accounts of temperature rises of one to three degrees Celsius since the 1920s and 1930s, and questioned whether the remaining wild Atlantic salmon of the Gulf of Maine DPS will be able to survive such climatic variability.

Response: An examination of the effect of warming climate on fishery resources illustrates the challenges to fish on the southern end of their range. Climate models predict significant warming over the next century as the carbon dioxide content of the atmosphere increases. Records show that there have been periods of warming and cooling of the North Atlantic Ocean, but changes have not been uniform over all areas.

Global warming can have an effect on sea temperatures, wind currents, fresh water input, and mixing of the ocean's surface layer. Fish, being poikilotherms, maintain

a body temperature almost identical to their surrounding environment. Thermal changes of just a few degrees Celsius can critically affect biological functions in salmonids such as protein metabolism (McCarthy and Houlihan, 1997; Somero and Hofmann, 1997; and Reid et al., 1998), response to aquatic contaminants (Reid et al., 1997), reproductive performance (Van Der Kraak and Pankhurst, 1997), smolt development (McCormick et al., 1997), species distribution limits (McCarthy and Houlihan, 1997; Keleher and Rahel, 1996; and Welch et al., 1998), and community structure of fish populations.

It has been suggested that an overall increase in river water temperatures due to global warming may actually benefit certain fish populations due to greater growth opportunity. Increased opportunities for growth in the spring and summer could increase the percentage of fish that enter the upper size distribution of a population and smolt the following spring (Thorpe, 1977; Thorpe et al., 1980; and Thorpe, 1994). In addition, warmer rearing temperatures during the late winter and spring have been shown to advance the timing of the parr-smolt transformation in Atlantic salmon (Solbakken et al., 1994). There is, however, an optimal temperature range and a limit for growth after which salmon parr will stop feeding due to thermal stress. During this time, protein degradation and weight loss will increase with rising water temperature (McCarthy and Houlihan, 1997).

Issue 20: Threat Posed by Public Hatchery Practices

Comment 37: Some commenters stated that the Status Review did not adequately address the risks posed by public hatchery practices given their dominant influence on Maine salmon and the proposed extension of the ESA s protection to their output.

Response: It is true that a hatchery program can have large impacts, both positive and negative, on fish populations. Every precaution is being taken to ensure that the river-specific rehabilitation program in Maine will enhance the population in a positive manner. Broodstock are collected in such a manner as to maximize the genetic material available in the individual rivers.

The rehabilitation program is carried out with the guidance of state and Federal fish genetic experts, and spawning is conducted according to protocols developed and peer reviewed by the Maine TAC and Assessment Committee. Activities are guided by program specific documents such as the following: Broodstock Collection Recommendations to the Maine TAC by the Maine Atlantic Salmon Broodstock Working Group; Management and Spawning Protocols for Atlantic Salmon Broodstocks at the CBNFH, October, 1997; CBNFH Interim Disease Management Plan, Best Management Plan for SSSV by the Lamar (PA) Fish Health Unit, November 1999; Atlantic Salmon Broodstock Management and Breeding Handbook by the USFWS, Biological Report 89 (12) July 1989; and the CBNFH Standard Husbandry Procedures for Biosecurity (In draft). Activities are also guided by regional and agency policies and guidelines regarding fish health and management plans such as the following: Maine Atlantic Salmon Restoration and Management Plan, 1995-2000, Atlantic Sea Run Salmon Commission; Report of the Maine Atlantic Salmon Authority to the Joint Standing Committee on Inland Fisheries and Wildlife; Maine Atlantic Salmon Management Plan with Recommendations Pertaining to Staffing and Budget Matters, January 1997; and Atlantic Salmon Conservation Plan for Seven Maine Rivers, The Maine Atlantic Salmon

Task Force. March 1997.

Fish health management is conducted in close consultation with the FWS Lamar Fish Health Unit, the Maine Fish Health Technical Committee, and in strict compliance with state, regional, and Federal regulations, protocols, and guidelines.

Hatchery populations are included as part of the DPS when they are similar to the native, naturally spawned fish, and are listed along with the DPS when they are determined to be essential to the recovery of the wild population. These hatchery populations are vital to compensate for the prolonged period of low adult returns, but they are not counted as part of the recovery goal. That goal is based upon wild spawners returning. Since the river specific broodstock were derived from the wild populations, they are determined to be similar to the naturally spawning fish. Genetic analysis of the broodstock has confirmed that the genetic diversity of the wild populations is being maintained in the captive population. Therefore, the river-specific broodstock and their progeny are part of the DPS. The purpose of the river-specific program is to facilitate recovery of these depleted populations. The river specific program is providing a critical role in increasing the effective population size of five of the populations within the DPS, and therefore providing a buffer against extinction. The hatchery populations are, therefore, essential to the survival and recovery of the wild populations. The Services further believe that naturally spawning Atlantic salmon populations founded by the hatchery populations will play an important role in the recovery process.

The Services have issued a final policy regarding controlled propagation of species listed under the ESA (65 FR 56916, September 20, 2000). The policy recognizes

that, in certain circumstances, controlled propagation is an essential tool for the conservation and recovery of listed species. The policy advises that if controlled propagation is to be used as a strategy in the recovery of a listed species, it must be conducted in a manner that will minimize risk to existing populations and preserve the genetic and ecological distinctness of the listed species. These have all been considerations in designing and administering the current hatchery program. The ongoing and future role of the river-specific rearing program in the overall recovery plan for the Gulf of Maine DPS will be fully addressed in the recovery plan to be developed following this listing action.

Issue 21: Impact on Individuals

Comment 38: Many commenters expressed concern that listing would affect the conduct of their daily lives by imposing additional restrictions upon them once listing occurred.

Response: Unless an individual or organization is engaged in an activity that is likely to result in a take of Atlantic salmon, they will not be affected by the listing. A list of potential take activities was provided in the proposed rule and a revised list is being published in this final rule. It is the opinion of the Services that few, if any, individual citizens will be engaged in these activities or any others which may cause take of salmon. The Services remain committed to working with individuals and industries to ensure adequate protection is provided to Atlantic salmon and their habitat while minimizing effects to individuals and businesses. The Services acknowledge that listing the DPS may require some modification of current practices in the aquaculture and

agriculture industries, and the Services have been working with the affected groups to achieve the necessary level of protection for salmon within the DPS. We are confident that these changes can be accomplished with minimal disruptions.

Issue 22: Citizen Suits

Comment 39: Some commenters suggested that listing the DPS would bring a rash of lawsuits pursuant to the citizen suit provision of the ESA. The intent of the suits would be to force changes in land use or business practices in Maine.

Response: Section 11(g) of the ESA entitled "Citizen Suits" says, in part, "any person may commence a civil suit on his own behalf (A) to enjoin any person, including the United States and any other Governmental instrumentality or agency (to the extent permitted by the eleventh amendment to the Constitution), who is alleged to be in violation of any provision of this act or regulation issued under the authority thereof.

This provision of the ESA is exercised by citizens or organizations seeking redress in those instances where they contend that no action, limited action, or inappropriate action is putting listed or petitioned, species at risk. The individual or organization making such claims is required to present information to support its position. Currently, the only salmon-related active citizen suits under this provision in Maine are against the Services for accepting the State of Maine Atlantic Salmon Conservation Plan in 1997, and concurrently withdrawing a proposed rule designating a seven-river DPS as threatened.

Issue 23: Resources for Recovery

Comment 40: Some commenters expressed concern that there were not adequate resources to bring about salmon recovery.

Response: The determination of whether a species is threatened or endangered is a biological one and does not consider the economic benefits or costs of listing. The Services acknowledge that listing does not guarantee that additional funding will become available, but the endangered or threatened designation raises the level of awareness about the species plight, and allows the Services to spend funds from the portions of both Services budgets designated for listed species management and protection. It also increases the likelihood that other involved Federal, State, and private organizations will dedicate more funds for salmon recovery. It is also important to note that section 7 of the ESA provides mandatory protection from any Federally permitted, authorized, funded, or carried out activities that would cause jeopardy. In fact, the proposal has already generated increased involvement and funding commitments from a number of Federal agencies including the Environmental Protection Agency (EPA), ACOE, and the Natural Resource Conservation Service. The State of Maine has also authorized additional salmon funds in the most recent legislative session.

Issue 24: Economic Concerns

Comment 41: Many commenters at the public hearings orally and in writing expressed concern that additional regulations that accompany listing would cause severe economic hardship, particularly in Washington County, and that many people could lose their jobs as a result.

Response: Section 4(b)(1)(A) of the ESA states, in part, that listing determinations shall be made, ..sol ely on the basis of the best scientific and commercial data available.. without weighing economic factors. The Services acknowledge the concerns that have been expressed and have adopted a number of policies to make implementation of the ESA more flexible and to increase the options that affected citizens have in order to comply with the law. These are designed to encourage conservation by private landowners and others and provide them some certainty as to what is expected in the future. These policies include: Safe Harbor Agreements, which provide landowners who voluntarily implement conservation actions for listed species with assurances that their regulatory obligations will not increase with an increase in these species on their lands; habitat conservation plans (HCPs) or conservation plans, which must accompany an application for a Section 10(a)(1)(B) incidental take permit; and No Surprises under Section 10(a)(1)(B), which provides assurances to landowners that if unforeseen circumstances arise, there will be no additional commitment of land, water or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in a properly implemented habitat conservation plan.

Issue 25: Predation

Comment 42: Many commenters expressed concerns that unchecked populations of seals and cormorants were contributing to declining salmon populations.

Response: The FWS has begun development of a draft Environmental Impact Statement (EIS) and management plan for double crested cormorants. It will explore

alternatives for managing cormorants throughout the contiguous United States including such options as a hunting season, control at breeding colonies by state agencies, and the continued issuance of depredation permits to private landowners. Maine has identified salmon as one of several issues that should be examined during the EIS process, as required under the National Environmental Policy Act of 1969 (NEPA).

The 2000 Annual Meeting of the USASAC held a special session on seals and seal predation on Atlantic salmon. It was reported that populations of both grey and harbor seals have experienced steady growth since the early 1980s. Harbor seals in the vicinity of the Maine coast have experienced an 8.9-percent annual increase in their population. Populations of grey seals experienced a 7.4-percent annual growth in the Gulf of St. Lawrence, and a 12.6-percent increase at Sable Island. It was noted that seals are opportunistic feeders and will target both benthic and schooling pelagic fish species. Primary diet items of harbor seals include herring, cod, pollock, squid and hake. No salmon have been identified in harbor seal stomachs. Grey seals feed primarily on squid, herring, hake, and cod. There are two documented cases of grey seal predation on Atlantic salmon in the Gulf of St. Lawrence. During trapping operations in Maine incidents of scarring and injury on adult Atlantic salmon have been observed. The DFO conducted a literature search on seal predation and found that only two Atlantic salmon were found out of 5,680 seal stomachs examined. It was noted that if 100 percent of the Atlantic salmon biomass in the Atlantic Ocean were consumed by harp seals, Atlantic salmon would account for only 0.01 percent of their annual diet. This illustrates the difficulty in documenting Atlantic salmon predation by seals.

Based on existing information, it appears that additional investigation is warranted to examine the potential for localized seal predation on salmon at critical concentration points and times such as during smolt outmigration and in the vicinity of weirs. In addition, seal predation at marine cages is of concern because it results in a loss in inventory for the grower and because it increases the potential for escape of farmed fish. The NMFS is working with the State of Maine to investigate these issues.

Lethal take of marine mammals is authorized under the Marine Mammal Protection Act (MMPA) under very limited situations. Specifically, section 109(h)(1) of the MMPA authorizes Federal, state, and local officials to take marine mammals in a humane manner in the course of their duties if such taking is for: (A) the protection or welfare of the mammal, (B) the protection of the public health and welfare, or (C) the nonlethal removal of nuisance animals. Section 101(c) authorizes the taking of marine mammals if imminently necessary in self defense or to save the life of a person in immediate danger. Lethal taking to protect fishing gear or catch is prohibited by section 118(a)(5) and 101(a)(4). In the 1994 amendments to the MMPA, Congress directed a scientific investigation be conducted to determine whether California sea lions and Pacific harbor seals are having a significant negative impact on the recovery of salmonid fishery stocks listed under the ESA or are having broader impacts on the coastal ecosystems of Washington, Oregon, and California. The Working Group recommended additional research in a number of areas but found that existing information on the seriously depressed status of many salmonid stocks is sufficient to warrant actions to remove pinnipeds in areas of co-occurrence where pinnipeds prey on depressed salmonid

populations. In February 1999, based on these working group recommendations, NMFS submitted a report to Congress with the following four recommendations: implement site-specific management for California sea lions and Pacific harbor seals; develop safe, effective, non-lethal deterrents; selectively reinstate authority for commercial fishers to kill harbor seals and sea lions to protect their gear and catch; and conduct additional research. Studies on the interactions of seals with netpens and at natural concentration sites (weirs, falls) should be conducted.

Issue 26: Forest Practices

Comment 43: Some commenters suggested that current forest practices may be negatively affecting salmon.

Response: Although the Status Review and the Maine Atlantic Salmon Conservation Plan identify a number of activities associated with forest practices that have the potential to affect salmon, the Services do not believe that current forest practices pose a significant threat to the well-being of the species. However, given the precarious status of the species even minor impacts must be recognized and dealt with. Consequently, the Services will continue to work with the industry, the Watershed Councils, and Project SHARE to secure additional habitat protection throughout the watersheds.

Issue 27: Agricultural Practices

Comment 44: A number of commenters expressed concern that agricultural activities in Maine were negatively impacting salmon.

Response: The Services do not believe that current agricultural practices are a major threat to the DPS with the exception of water withdrawals from the Pleasant, Narraguagus, and Machias Rivers. Pesticide sampling has been conducted in seven of the DPS watersheds, and hexazinone was the only chemical detected. There is no evidence that it is toxic to fish. Pollution from livestock can affect water quality, but efforts are underway to eliminate the impacts. Livestock husbandry is limited primarily to the mid-coast watersheds. As noted here, significant progress is being made to insure that withdrawals of irrigation water are protective of salmon, but more work remains to be done before the Services can consider this threat to be eliminated. The Services will continue to monitor forestry and agricultural practices and their effects on salmon during the recovery process.

Issue 28: Local Involvement

Comment 45: A number of commenters urged the Services to be cognizant of the critical role of local citizens in the protection and recovery of Atlantic salmon. Some expressed concern that the involvement and cooperation of such citizens would cease with a listing action.

Response: The Services fully agree that the successful recovery of Atlantic salmon will depend on the cooperation and involvement of the citizens of Maine and in particular those who live and work in the eight watersheds. The ESA encourages cooperative efforts and local involvement. As stated at the public hearings and elsewhere, the Services intend to draft a recovery plan for the Gulf of Maine DPS of Atlantic salmon by building upon the model of the Maine Conservation Plan which emphasizes citizen

involvement. The Services envision a large role for the Watershed Councils in the recovery planning process and, based on comments provided at the public hearing, will also involve local Soil and Water Districts.

Summary of Factors Affecting the Gulf of Maine DPS of Atlantic Salmon

Section 4 of the ESA (16 U.S.C. 1533) and regulations promulgated to implement the listing provisions of the ESA (50 CFR part 424) set forth the procedures for adding species to the Federal list. Section 4 also requires that listing determinations be based solely on the best scientific and commercial data available, without consideration of possible economic or other impacts of such determinations. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1) of the ESA. These factors and their application to the Gulf of Maine DPS of Atlantic salmon are described here.

(A) The Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Demonstrated and potential impacts to Atlantic salmon habitat within the DPS watersheds result from the following causes: (1) Water extraction; (2) sedimentation; (3) obstructions to passage including those caused by beaver and debris dams and poorly designed road crossings; (4) input of nutrients; (5) chronic exposure to insecticides, herbicides, fungicides, and pesticides (in particular, those used to control spruce budworm); (6) elevated water temperatures from processing water discharges; and (7) removal of vegetation along streambanks. The most obvious and immediate threat is

posed by water extraction on some rivers within the DPS range, as it has the potential to expose or reduce salmon habitat.

The threat of blocked passage due to debris or beaver dams is an annual event. The ASC, Project SHARE, and the Watershed Councils have demonstrated an ability to annually remove or reduce that threat. Chronic exposure to chemical residues in the water is a threat that warrants further investigation. In particular, potential impacts during the process of smoltification are being examined. Sedimentation from a variety of sources also warrants closer review as it may be altering habitat and rendering it incapable of supporting Atlantic salmon. Water temperatures in the vicinity of berry processing water discharges should be monitored to determine if they make habitat unsuitable for Atlantic salmon. Permit exemptions for agriculture practices should be evaluated to determine if they provide adequate protection to riparian habitat.

All of these potential impacts to Atlantic salmon habitat need to be examined in more detail for their individual and cumulative impacts. Study results on the Narraguagus River demonstrate that full freshwater production is not being achieved despite fry stocking efforts. These results could mean that one or a combination of factors within the rivers is negatively impacting freshwater habitat for Atlantic salmon. The relationship between these factors and freshwater production and survival of salmon needs to be studied in detail so that cause and effect connections can be determined or ruled out. Corrective actions can then be implemented as appropriate to enhance recovery.

There does not appear to be one particular habitat issue which poses a significant

threat to the entire DPS by itself. Because of their indirect relationship to habitat, agricultural water withdrawals are discussed separately in relation to listing factor (D) below. Additional study will be needed to determine whether the cumulative impacts from habitat degradation discussed here may reduce habitat quality and limit habitat quantity available to Gulf of Maine DPS salmon at various stages in their life history within freshwater. At present, the scientific and commercial data available do not show that loss of habitat is creating a danger of extinction to the DPS.

(B) Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The United States joined with other North Atlantic nations in 1982 to form the North Atlantic Salmon Conservation Organization (NASCO) for the purpose of managing salmon through a cooperative program of conservation, restoration, and enhancement of North Atlantic stocks. NASCO achieves its goals by controlling the exploitation by one member nation of Atlantic salmon that originated within the territory of another member nation. The U.S.' interest in NASCO stemmed from its desire to ensure that foreign fisheries intercepting U.S. origin fish did not compromise the long-term commitment by the states and Federal government to rehabilitate and restore New England Atlantic salmon stocks.

On February 5, 1999, the DFO announced adoption of the precautionary approach by a continued closure of the commercial Atlantic salmon fishery for Newfoundland and Labrador for an additional three years. Further restrictions on Canadian Atlantic salmon recreational fisheries were also announced, including the requirement to only use barbless hooks for angling in Newfoundland and Labrador, and coordination with Watershed

Management groups.

In 1999, the West Greenland Commission of NASCO agreed on a multi-year approach for conservation of salmon stocks in Greenland, and, therefore, for 1999 and 2000, the catch at West Greenland in each of the years is restricted to the amount used internally in Greenland. The reported catch in 1999 was 19 tons and the unreported catch was estimated to be approximately 10 to 15 tons. Based on discriminant analysis of characteristics from scales sampled in the fishery, 91 percent of fish in 1999 were of North American origin, the highest proportion on record. The catch at West Greenland in 1999 was estimated to consist of 17.8 tons (5,700 salmon) of North American origin and 1.8 tons (600 salmon) of European origin. These values represent an increase of 84 percent of the North American and a reduction of 33 percent of the European components, respectively, from the landings in 1998.

In October 1987, the New England Fishery Management Council prepared a Fishery Management Plan (FMP) to implement U.S. management authority for all Atlantic salmon of U.S. origin pursuant to the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1801 et seq. The FMP was intended to safeguard U.S. Atlantic salmon, protect the U.S. investment in the state/Federal restoration program, and strengthen the U.S. position in international negotiations. The FMP prohibits possession of Atlantic salmon in the Exclusive Economic Zone.

Starting in the 1980s, as runs decreased, the Maine Atlantic Sea Run Salmon Commission imposed increasingly restrictive regulations on the recreational harvesting of Atlantic salmon in Maine. The allowable annual harvest per fisherman was reduced by

the State from ten salmon in the 1980s to one grilse in 1994. In 1995, regulations were promulgated to allow only catch and release fishing for Atlantic salmon in Maine, closing the last remaining recreational harvest opportunities for sea run Atlantic salmon in the United States. From the 1960s through the early 1980s, the average exploitation rate in Maine rivers has been estimated to range from approximately 20 percent to over 25 percent of the run (Beland, 1984; Baum, 1997). In retrospect, this level of harvest was likely too high, especially in light of the extensive commercial harvest at that time. In 1993, the documented sport catch of sea-run Atlantic salmon in Maine was 659 fish, with 152 killed, and 507 released (USASAC, 1994). The USASAC reported that 33 fish were caught and released within the range of the DPS in 1997, 20 fish in 1998, and 12 in 1999. In December 1999, salmon angling was closed statewide.

Atlantic salmon parr remain vulnerable to harvest by trout anglers and mortality associated with this activity has been documented. It is believed that poaching activity occurs at fairly low levels in Maine rivers. The low returns of wild adult salmon to Maine rivers highlight the importance of continuing assessment of all sources of mortality that may pose a risk to the DPS.

Both commercial and recreational harvest of Atlantic salmon historically played a role in the decline of the Gulf of Maine DPS of Atlantic salmon. The Canadian commercial fishery in Newfoundland and Labrador is under a moratorium for the next 3 years. The West Greenland commercial fishery will continue as an internal use only fishery through the 2000 fishing season. Continuation of the internal use fishery in Greenland poses a reduced but continuing concern to the Gulf of Maine DPS of Atlantic

salmon. Recreational fishing targeting other species also has the potential to result in the incidental catch of Atlantic salmon at various life stages. This could result in their injury or death. Thus, these fisheries also pose a threat to Atlantic salmon. There was one documented poaching event in 1998, indicating that poaching continues to pose a threat to Atlantic salmon. Continued enforcement efforts and adequate penalties are essential to minimize this threat.

In view of elimination of the directed fishery in Maine and changes in the high seas fishery, the existing commercial fishery off West Greenland and bycatch in existing recreational fisheries in Maine are no longer considered as limiting the survival of the Gulf of Maine DPS of Atlantic salmon. Therefore, the best data presently available do not show that overutilization is creating a danger of extinction.

(C) Disease or Predation

Fish diseases have always represented a source of mortality to Atlantic salmon in the wild, though major losses due to disease are generally associated with salmon aquaculture. The level of threat from disease has remained relatively static until the last 3 years. Three recent events that have increased disease as a threat to the DPS are: (1) The appearance of the ISA virus in 1996 in Canada, within the range of possible exposure of migrant DPS salmon, subsequent spreading of that disease closer to the Maine border, and the collection of aquaculture escapees and wild fish testing positive for the ISA virus; (2) the discovery in 1998 of the retrovirus SSSV within the DPS; and (3) new information available in 1999, on the potential impact of coldwater disease (CWD) on salmon.

Wild parr were taken from the Pleasant River, Maine, in 1995 (180), 1996 (80), and 1997 (164), and held in isolation at the NANFH and a private hatchery in Deblois, ME for the purposes of rearing the fish to sexual maturity, spawning them, and returning progeny back to the Pleasant River. Mortalities associated with tumors in the viscera (particularly the swimbladder) began to appear in the salmon at North Attleboro in 1997 and continued in 1998. Cornell University scientists identified the causative agent as a retrovirus named SSSV that had never been previously documented except once in Scotland in the 1970s. Virus-positive fish from North Attleboro were moved to a quarantine facility at the USGS facility in Leetown, WV to obtain detailed information about the virus.

Pleasant River fish at the Deblois Hatchery were also found to be positive for the virus, though no disease or mortality occurred. Further testing of wild salmon held as broodstock at the CBNFH showed that the virus was present in carrier state in eight individuals of over 500 tested. Some of these individuals had been in captivity for several years, and others were only recently captured and held in isolation. The implications are that the virus exists at some level in wild populations and has been present for at least several years. However, its presence in a carrier state in two other hatcheries, some for several years, without any clinical indication of disease, and the lack of any observation of symptoms in wild populations suggest that the threat of disease from SSSV is limited. Until future research or experience provides additional information, the threat associated with this virus remains uncertain. The virus has caused lethal disease under conditions that existed at one hatchery and, therefore, must be

considered a threat.

The second virus that represents a relatively new threat to the DPS is the causative agent of ISA. This virus causes lethal disease in maturing salmon held in salt water. Discovered in 1984, it was known only in Norway prior to 1996, when it was diagnosed in aquaculture sea pens in New Brunswick, Canada. The following year it was found in Scotland. Monitoring in the Magaguadavic River in New Brunswick by the Atlantic Salmon Federation has confirmed both aquaculture escapees and wild fish infected with the ISA virus. There is no known control of the disease except removal of fish held within 5 km of an infected site. An extensive survey of Maine aquaculture operations found no ISA virus present within the United States. The Province of New Brunswick has taken extensive actions to control the spread of the virus. But the effectiveness of these actions is not assured and the affected Canadian aquaculture operations are near U.S. pen sites. Thus the virus represents a serious threat because of its potential to spread to the U.S. pens near the rivers and migration routes used by the Gulf of Maine DPS of Atlantic salmon.

Cold Water Disease caused by the bacterium Flavobacterium psychrophilum has recently been found to be a serious problem to Atlantic salmon in New England waters. New information from ongoing studies by the Biological Resources Division of the USGS at their Leetown Science Center, WV has shown that the pathogen induces pathology and subsequent mortality among juvenile Atlantic salmon. The pathogen is transmitted vertically from carrier sea-run adults to offspring via the eggs.

Predation has always been a factor influencing salmon numbers but under

conditions of a healthy population would not be expected to threaten the continued existence of that population. The threat of predation on the Gulf of Maine DPS of Atlantic salmon is significant today because of the very low numbers of adults returning to spawn and the dramatic increases in population levels of some predators, including cormorants, striped bass, and several species of seals.

Most rivers within the DPS range do not contain dams that delay and concentrate salmon smolts and make them more vulnerable to cormorant attacks. Also, the recovery of striped bass populations over the past decade is concentrated more in rivers south of the DPS range. Furthermore, cormorants and striped bass are transitory predators impacting migrant juveniles in the lower river and estuarine areas. Seals, however, have reached high population levels not reported before, and salmon remain vulnerable to seal predation through much of their range.

In summary, the threat of disease is escalated both by its potential impact on Atlantic salmon in the wild and the threat it poses to the health of the river-specific broodstock and to the role of the hatchery program in the recovery effort. The best available scientific and commercial data show that disease presently creates a danger of extinction to the Gulf of Maine DPS of Atlantic salmon. There are insufficient data at this time to show that predation creates a danger of extinction to the DPS.

(D) Inadequacy of Existing Regulatory Mechanisms

Major threats continue to be poor marine survival, water withdrawals, disease, and aquaculture impacts, especially interaction with European strain and hybrid

(European/North American) salmon. A variety of state and Federal statutes and regulations seek to address threats to Atlantic salmon and their habitat. These laws are complemented by international actions under NASCO, many interagency agreements, and state-Federal cooperative efforts. Implementation and enforcement of these laws and regulations could be strengthened to further protect Atlantic salmon. The appropriate state and Federal agencies have established coordination mechanisms and have joined with private industries and landowners in partnerships for the protection of Atlantic salmon. These partnerships will be critical to the recovery of the species. Existing regulatory mechanisms either lack the capacity or have not been implemented adequately to decrease or remove the threats to wild Atlantic salmon. The discussion that follows will focus on those laws which have not proven sufficient to deal with threats, or, if adequate, are not being sufficiently implemented or enforced.

(1) Water withdrawals

Maine has made substantial progress in addressing the issue of agricultural water withdrawals but regulations and water use planning are not complete and in place to provide sufficient protection to the DPS. The Maine Land and Water Resource Council and the Maine Land Use Regulatory Commission (LURC) must approve requests for withdrawals for irrigation, and can curtail withdrawals if water levels go below what is considered necessary for the well being of the species. Until the water use planning is complete, however, the allowable surplus above that needed for salmon has not been quantified. In 1999, the LURC limited the amount of water that could be drawn from the Pleasant, Narraguagus, and Machias Rivers. The State Department of Environmental

Protection (DEP) is developing a rule to address withdrawals on a state-wide basis. At this point, water withdrawals in unorganized towns are not regulated. The absence of completed water management plans for all DPS rivers subject to future agricultural water withdrawals, and of permanent protection for salmon flows, creates a danger of extinction for the Gulf of Maine DPS.

(2) Disease

The European ISA virus has become established in North American aquaculture fish in proximity to Atlantic salmon in the DPS. The Services believe that Maine s fish health regulations may not fully ensure testing, reporting, and depopulation of diseased fish. Consequently, there remains an extremely serious possibility of ISA disease spreading from aquaculture fish. Also, the occurrence of a heretofore unknown retrovirus, SSSV, is not yet specifically addressed by any regulations. Disease episodes have impacted the Services river-specific stocking program in that Pleasant River broodstock had to be destroyed. Efforts are now underway to reestablish that broodstock. The Services thus conclude that inadequate regulation of disease vectors presents a serious threat to the health of the DPS.

(3) Aquaculture

The known risks inherent in wild stocks interacting with aquaculture escapees have increased significantly from 3 years ago when the Services believed that certain restrictions on the importation and use of foreign salmon stocks were in place and enforced. Available data indicate that the percentage of European strain hybrid fish

raised in aquaculture facilities has increased. Maine State Law (PL 1991 c381 sub section 2) restricts importing fish and eggs, but fails to restrict importing European milt, thus enabling expansion of the use of hybrids between European and North American salmon in aquaculture. Also, permit holders have continued to use European strains or hybrids despite their commitment not to when obtaining ACOE permits, which were issued in reliance on applications which stated that no European strains or hybrids would be placed in cages. In addition, permits have not been issued by the EPA under the Clean Water Act to limit the discharge of pollutants from these aquaculture facilities. Thus, existing regulatory mechanisms are not adequate to address the threat of non-native Atlantic salmon used in aquaculture facilities.

Existing regulatory mechanisms are not sufficient to remove the threat posed by agricultural water withdrawals, disease, and aquaculture to the Gulf of Maine DPS of Atlantic salmon. Given extremely low numbers of adult returns, without adequate regulation these threats create a danger of extinction of the Gulf of Maine DPS of Atlantic salmon.

(E) Other Natural or Manmade Factors Affecting its Continued Existence

The Maine Atlantic salmon aquaculture industry is currently composed of 12 companies, at 33 sites, with 773 cages covering 800 leased acres of water. Farms are concentrated in Cobscook Bay near Eastport, ME, but are located as far south as the Sheepscot River, although that site currently does not grow Atlantic salmon. The industry in Canada is approximately twice the size of the Maine industry. In addition, two freshwater hatcheries are located on rivers within the DPS range.

Atlantic salmon that escape from farms and hatcheries pose a threat to native Atlantic salmon populations in coastal Maine rivers. Escapes and resultant interactions with native stocks are expected to increase given the continued operation of farms and growth of the industry under current practices. There is substantial documentation that escaped farmed salmon disrupt redds of wild salmon, compete with wild salmon for food and habitat, interbreed with wild salmon, transfer disease or parasites to wild salmon, and/or degrade benthic habitat (Clifford, 1997; Youngson et al., 1993; Webb et al., 1993; Windsor and Hutchinson, 1990; and Saunders, 1991). A comparison study in Canada revealed that survival of wild post-smolts moving from Passamaquoddy Bay to the Bay of Fundy was inversely related to the density of aquaculture cages (DFO, 1999). In addition, there has recently been concern over interactions when wild adult salmon migrate past closely spaced cages, creating the potential for behavioral interactions, disease transfer or interactions with predators (DFO, 1999; Crozier, 1993; Skaala and Hindar, 1997; Carr et al., 1997; and Lura and Saegrov, 1991).

Atlantic salmon that either escaped or were released from aquaculture facilities have been found in the St. Croix, Penobscot, Dennys, East Machias, and Narraguagus Rivers in the United States (Baum, 1991; USASAC, 1996; 1997). In 1994 and 1997, escaped farmed fish represented 89 percent and 100 percent, respectively, of the documented run for the Dennys River, and in 1995, 22 percent of the documented run for the Narraguagus River. Escaped farmed salmon have also been documented as an incidental capture in the recreational fishery, and observed in the Boyden, Hobart, and Pennamaquan Rivers. The first aquaculture escapee in the State of Maine was

documented in 1990, and the first sexually mature escapee was documented in 1996. Escaped farmed fish are of great concern in Maine because even at low numbers they can represent a substantial portion of fish in some rivers. Also, populations at low levels are particularly vulnerable to genetic intrusion or other disturbance caused by escapees (DFO, 1999; Hutchings, 1991). Preliminary results from the 1999 wild smolt assessment project in the Pleasant River suggest that several outmigrating smolts were of hatchery origin based on fin condition (Kocik et al., 1999, unpublished data). Of the 676 outmigrating smolts that were captured between April and May 1999, between five percent and 25 percent were estimated to be of hatchery origin.

Given current aquaculture practices, the Services have opposed the use of reproductively viable European strains (pure and hybrid) of Atlantic salmon within North America and the continued importation of European gametes (milt). This opposition is based on genetic studies that demonstrate that there are significant differences between North American and European Atlantic salmon (King et al., 1999), and the advice from geneticists that interbreeding among genetically divergent populations negatively impacts natural populations (Utter, 1993; Verspoor, 1997; and Youngson and Verspoor, 1998). The introgression by non-North American Atlantic salmon stocks presents a substantial threat of disrupting the genetic integrity of North American stocks and threatens fitness through outbreeding depression.

Comprehensive protective solutions to minimize the threat of interactions between wild and aquaculture salmon have not been implemented. The industry voluntarily adopted a Code of Practice in October 1998. The Services are not aware of monitoring

results of that Code but note that escapes continued to be documented in the DPS in 1999 and 2000, when the Code was in place. Weirs help minimize the potential interaction between escapees and wild salmon, but they are not present on all rivers and where present are only in place seasonally. In 1997 and 1998, the Services worked with industry and State representatives in an attempt to eliminate further importation of European stocks, remove pure European strain from marine cages, mark all fish prior to placement in marine cages, and phase out the holding of North American/European hybrids. These efforts were unsuccessful. In July of 1999, the Services initiated discussions directly with the Maine DMR (the state agency responsible for aquaculture industry regulation). These discussions were only partially successful because, although information was exchanged, agreement on timing or specific measures was not reached.

Further, marine survival rates, as discussed in a second threat within factor (E), continue to be low for U.S. stocks of Atlantic salmon, and the subsequent low abundance of salmon impedes recovery of the DPS. Scientists have attributed natural mortality in the marine environment to sources that include stress, predation, starvation, disease, parasites, and abiotic factors. In addition, scientific studies indicate that year-to-year variation in return rates of U.S. salmon stocks is generally synchronous with other North Atlantic stocks. This information suggests that the trend in return rates is, in part, the result of factors that occur when the stocks are in the North Atlantic, particularly the Labrador Sea. Scientists have concluded that a significant proportion of the variation in recruitment or return rate is attributed to post-smolt survival. However, the factors responsible for reduced post-smolt survival are not well understood.

Thus, existing aquaculture practices and low marine survival create a danger of extinction of the Gulf of Maine DPS of Atlantic salmon.

State Conservation Efforts

Section 4(b)(1)(A)of the ESA requires us, in making a listing determination, to take into account efforts being made by the state, foreign nations, or their political subdivisions, to protect the DPS of Atlantic salmon. In 1997, Maine developed a conservation plan that attempted to identify and address threats to the species. The state has implemented a number of the items contained in the various sections of the plan. Additional details on conservation activities can be found in the 1999 Annual Progress Report on implementation of the Maine Atlantic Salmon Conservation Plan for Seven Maine Rivers, prepared by the Maine Atlantic Salmon Commission and available at www.state.me.us/asa/99AnnRpt.html. Since publication of the proposed rule on November 17, 1999, the following accomplishments can be noted:

a. In December 1999, the State closed all salmon fishing until further notice, thus eliminating this as a source of mortality. The possibility of mortality from bycatch still exists when trout, striped bass, and other fish are the being targeted.

b. The final draft of the Pleasant River water use management plan is scheduled for completion in the fall of 2000. Draft plans for the Narraguagus River and a major tributary will be available then as well. Planning efforts have included instream flow requirements to protect salmon, and alternative sources of water are being sought.

c. The State of Maine appropriated $810,000 for Atlantic salmon in fiscal year

2000/2001. The DEP hired a water quality specialist dedicated to the DPS rivers with a portion of those funds. The Maine ASC manages the distribution of the balance of available funds. Watershed Councils and other groups have submitted proposals for salmon and salmon habitat projects to the ASC for funding consideration.

d. Weirs constructed by the State of Maine are in place and functioning on the Dennys and Pleasant Rivers.

e. Acquisition and permanent protection of a 220-acre tract of land on the Narraguagus River was completed in October 2000.

f. The Maine ASC and the FWS continue to map salmon habitat in the eight DPS rivers. Mapping and geographic information system (GIS) coverage will be completed for the East Machias River this year.

In determining whether to make this rule final, we have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by the Gulf of Maine DPS of Atlantic salmon, while taking into account ongoing conservation efforts and commitments made by the State of Maine and other entities. Based on our evaluation, listing the Gulf of Maine DPS of Atlantic salmon as endangered is warranted.

The Services are listing this DPS of anadromous Atlantic salmon as endangered under the ESA because of the danger of extinction created by factor (C) through disease; factor (D) through inadequate regulation of agricultural water withdrawals, disease, and aquaculture; and factor (E) through existing aquaculture practices and low marine

survival. These factors take on added significance given the poor adult returns and lower than expected parr to smolt survival. At present, the DPS is known to include populations of Atlantic salmon in the Sheepscot, Ducktrap, Narraguagus, Pleasant, Machias, East Machias, and Dennys Rivers, as well as Cove Brook. Both the naturally reproducing populations of the Gulf of Maine DPS of Atlantic salmon and those river-specific hatchery populations cultured from them are included in this listing. In the future, DPS populations may be identified in additional rivers based on ongoing stream surveys and continuing genetic analyses. This could be done in a separate notification process.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the ESA include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, state agencies, private organizations, groups, and individuals. The ESA provides for possible land acquisition and cooperation with the states and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against taking and harm are discussed, in part, here.

Section 7(a) of the ESA, as amended, requires Federal agencies to evaluate their actions with respect to any species that is listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the ESA are codified at 50 CFR part 402. Section

7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with us.

Federal activities that could occur and impact the Gulf of Maine DPS of Atlantic salmon include, but are not limited to, the carrying out or the issuance of permits for marine aquaculture pen sites, freshwater hatcheries, cranberry bog development, water withdrawal projects, pesticide registration, streambank stabilization, and road and bridge construction. In our experience, nearly all ESA section 7 consultations have been resolved so that the species have been protected and the project objectives have been met.

In addition, ESA section 7(a)(1) requires all Federal agencies to review the programs they administer and use these programs in furtherance of the purposes of the ESA. All Federal agencies, in consultation with us, are to carry out programs for the conservation of endangered and threatened species listed pursuant to section 4 of the ESA.

The Services believe that the State of Maine s Atlantic salmon conservation plan can become a strong foundation for recovery once it is revised and updated to take current conditions, threats, and progress into account. We will work closely with Maine agencies, conservation groups, and industry participants to bring the plan up to date and ensure effective implementation.

The ESA and its implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect or to attempt any of these), import or export, ship in interstate commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any endangered wildlife. To possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally is also illegal.

Our policy, as published in the Federal Register on July 1, 1994 (59 FR 34272), is to identify, to the maximum extent practicable, those activities that would or would not constitute a violation of section 9 of the ESA for the species. The intent of this policy is to increase public awareness as to the effects of this final listing on future and ongoing activities within this species range.

The Services believe that, based on the best available information, the following actions are unlikely to result in a violation of section 9:

(1) Possession of Atlantic salmon acquired lawfully by permit issued by the Services pursuant to section 10 of the ESA, or by the terms of an incidental take statement in a biological opinion pursuant to section 7 of the ESA;

(2) Federally approved projects that involve activities such as silviculture, agriculture, road construction, dam construction and operation, discharge of fill material, siting of marine cages for aquaculture, hatchery programs, and stream channelization or

diversion for which consultation under section 7 of the ESA has been completed, and when such activity is conducted in accordance with any terms and conditions given by the Services in an incidental take statement in a biological opinion pursuant to section 7 of the ESA;

(3) Routine culture and assessment techniques, including the FWS river-specific rehabilitation program at CBNFH; and

(4) Emergency responses to disease outbreaks.

Activities that the Services believe could result in violation of section 9 prohibitions against "take" of the Gulf of Maine DPS of anadromous Atlantic salmon include, but are not limited to, the following:

(1) Targeted recreational and commercial fishing, bycatch associated with commercial and recreational fisheries, and illegal harvest;

(2) The escapement of reproductively viable non-North American strain or non-North American hybrid Atlantic salmon in freshwater hatcheries within the DPS range;

(3) The escapement from marine cages or freshwater hatcheries of domesticated salmon such that they are found entering or existing in rivers within the DPS range;

(4) Failure to adopt and implement fish health practices that adequately protect against the introduction and spread of disease;

(5) Siting and/or operating aquaculture facilities in a manner that negatively impacts water quality and/or benthic habitat;

(6) Discharging (point and non-point sources) or dumping toxic chemicals, silt,

fertilizers, pesticides, heavy metals, oil, organic wastes or other pollutants into waters supporting the DPS;

(7) Blocking migration routes;

(8) Destruction and/or alteration of the species habitat (e.g., instream dredging, rock removal, channelization, riparian and in-river damage due to livestock, discharge of fill material, operation of heavy equipment within the stream channel, manipulation of river flow);

(9) Violations of discharge or water withdrawal permits that are protective of the DPS and its habitat;

(10) Pesticide or herbicide applications in compliance with or in violation of label restrictions; and

(11) Unauthorized collecting or handling of the species (permits to conduct these activities are available for purposes of scientific research or to enhance the propagation or survival of the DPS).

Other activities not identified here will be reviewed on a case-by-case basis to determine if violation of section 9 of the ESA may be likely to result from such activities. We do not consider these lists to be exhaustive and provide them as information to the public.

This final rule applies all ESA section 9 (16 U.S.C. 1538) protective measures to prohibit taking, interstate commerce, and other prohibitions applicable to endangered species, with the exceptions provided under section 10 of the ESA (16 U.S.C. 1539).

Section 9 of the ESA and implementing regulations (50 CFR 17.21) set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. These prohibitions apply to all individuals, organizations, and agencies subject to U.S. jurisdiction.

For listed species, ESA section 7(a)(2) (16 U.S.C. 1536(a)(2)) requires Federal agencies to ensure that activities they authorize, fund, or conduct are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Services. Consultations will be conducted on a river-specific basis pursuant to identification of river-specific recovery units within the DPS.

ESA sections 10(a)(1)(A) and 10(a)(1)(B) (16 U.S.C. 1539(a)(1)(A) and (a)(1)(B)) provide the Services with authority to grant exceptions to the ESA's "taking" prohibitions. Section 10(a)(1)(A) scientific research and enhancement permits may be issued to entities (Federal and non-Federal) conducting research that involves a directed take of listed species. A directed take refers to the intentional take of listed species. The Services have issued section 10(a)(1)(A) research/enhancement permits for other listed species for a number of activities.

ESA section 10(a)(1)(B) incidental take permits may be issued to non-Federal entities performing activities that may incidentally take listed species. The types of activities potentially requiring a section 10(a)(1)(B) incidental take permit include the operation and release of artificially propagated fish by state or privately operated and

funded hatcheries, state or university research not receiving Federal authorization or funding, and the implementation of state fishing regulations.

National Environmental Policy Act

The FWS has determined that Environmental Assessments and Environmental Impact Statements, as defined under the authority of the NEPA, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the ESA. The notice for this determination was published in the Federal Register on October 25, 1983 (48 FR 49244). NMFS has concluded that ESA listing actions are not subject to the environmental assessment requirements of the NEPA. (See NOAA Administrative Order 216-6).

Paperwork Reduction Act

This rule does not contain any new collections of information other than those already approved under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq., and assigned Office of Management and Budget clearance number 1018-0094 which expires on February 28, 2001. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid control number. For additional information concerning permit and associated requirements for endangered species, see 50 CFR 17.22.

References Cited

You may request a complete list of all references cited in this document from Paul Nickerson or Mary Colligan (see ADDRESSES).

Classification

The Conference Report on the 1982 amendments to the ESA notes that economic considerations have no relevance to determinations regarding the status of species, and that the Regulatory Flexibility Act is not applicable to the listing process. Similarly, listing actions are not subject to the requirements of Executive Order 13132 and are exempt from review under Executive Order 12866.

Authors

The primary authors of this document are Mary Colligan, NMFS, and Paul Nickerson, FWS; refer to ADDRESSES section.

List of Subjects

50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and record keeping requirements, Transportation.

50 CFR Part 224

Administrative practice and procedure, Endangered and threatened species, Exports, Imports, Reporting and record keeping requirements, Transportation.

For the reasons set out in the preamble, 50 CFR part 17 is amended to read as follows:

PART 17 ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500, unless otherwise noted.

2. Section 17.11(h) is amended by adding the following, in alphabetical order under FISHES, to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

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(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
* * * * * * *							
FISHES							
* * * * * * *							
Salmon, Atlantic	Salmo salar	U.S.A., Canada, Greenland, western Europe	U.S.A., ME Gulf of Maine Atlantic Salmon Distinct Population Segment, which includes all naturally reproducing wild populations and those river-specific hatchery populations of Atlantic salmon having historical, river-specific characteristics found north of and including tributaries of the lower Kennebec River to, but not including, the mouth of the St. Croix River at the U.S.-Canada border. To date, the Services have determined that these populations are found in the Dennys, East Machias, Machias, Pleasant, Narraguagus, Sheepscot, and Ducktrap Rivers and in Cove Brook, Maine.	E	705	NA	NA
* * * * * * *							

For the reasons set out in the preamble, 50 CFR part 224 is amended to read as follows:

PART 224-ENDANGERED MARINE AND ANADROMOUS SPECIES

3. The authority citation for part 224 continues to read as follows:

Authority: 16 U.S.C. 1531-1543 and 16 U.S.C. 1361 et seq.

4. In § 224.101, paragraph (a) is revised to read, in phyletic sequence, as follows:

§ 224.101 Enumeration of endangered marine and anadromous species.

* * * * *

(a) Marine and anadromous fish.

The following table lists the common and scientific names of endangered species, the locations where they are listed, and the citations for the listings and critical habitat designations.

Species[1]		Where listed	When listed	Critical habitat
Common name	Scientific name			
Shortnose sturgeon	Acipenser brevirostrum	U.S.A., northwestern Atlantic, in river systems from the Saint John River in New Brunswick, Canada, to the St. Johns River, Florida	32 FR 4001, Mar. 11,1967	NA
Southern California steelhead	Oncorhynchus mykiss	U.S.A., CA, including all naturally spawned populations of steelhead (and their progeny) in streams from the Santa Maria River, San Luis Obispo County, California (inclusive) to Malibu Creek, Los Angeles County, California (inclusive)	62 FR 43937, Aug. 18, 1997	64 FR 5740, Feb. 5, 1999
Upper Columbia River steelhead	Oncorhynchus mykiss	U.S.A., WA, including the Wells Hatchery stock and all naturally spawned populations of steelhead (and their progeny) in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S. - Canada Border	62 FR 43937, Aug. 18, 1997	64 FR 5740, Feb. 5, 1999
Snake River sockeye salmon	Oncorhynchus nerka	U.S.A., ID, Snake River	56 FR 58619, Nov. 20, 1991	58 FR 68543, Dec. 28, 1993

[1]Species includes taxonomic species, subspecies, distinct population segments (or DPSs, as defined in 61 FR 4722, February 7, 1996), and evolutionarily significant units (or ESUs, as defined in 56 FR 58612, November 20, 1991)

Upper Columbia River spring-run chinook salmon	Oncorhynchus tshawytscha	U.S.A., WA, including all naturally spawned populations of chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington (excluding the Okanogan River), the Columbia River from a straight line connecting the west end of the Clatsop jetty (south jetty, Oregon side) and the west end of the Peacock jetty (north jetty, Washington side) upstream to Chief Joseph Dam in Washington, and the Chiwawa River (spring run), Methow River (spring run), Twisp River (spring run), Chewuch River (spring run), White River (spring run), and Nason Creek (spring run) hatchery stocks (and their progeny)	64 FR 14308, Mar. 24, 1999	65 FR 7764, Feb. 16, 2000
Sacramento River winter-run chinook salmon	Oncorhynchus tshawytscha	U.S.A., CA, Sacramento River	59 FR 13836, Mar. 23, 1994	58 FR 33212, Jun. 16, 1993
Salmon, Atlantic	Salmo salar	U.S.A., ME Gulf of Maine Atlantic Salmon Distinct Population Segment, which includes all naturally reproducing wild populations and those river-specific hatchery populations of Atlantic salmon having historical, river-specific characteristics found north of and including tributaries of the lower Kennebec River to, but not including, the mouth of the St. Croix River at the U.S.-Canada border. To date, the Services have determined that these populations are found in the Dennys, East Machias, Machias, Pleasant, Narraguagus, Sheepscot, and Ducktrap Rivers and in Cove Brook, Maine.		NA
Totoaba	Cynoscion macdonaldi	Mexico, Gulf of CA	44 FR 29480, May 21, 1979	NA

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Dated: _____

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Penelope D. Dalton
Assistant Administrator for Fisheries
National Marine Fisheries Service

(~~Final Endangered Status for a Distinct Population Segment of Anadromous Atlantic Salmon (Salmo salar) in the Gulf of Maine; ID No. 102999A~~]

Dated: _____

_____
Jamie Rappaport Clark
Director
U.S. Fish and Wildlife Service